Advanced
Compliance Laboratory

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Electromagnetic Emission Compliance Test Report

Equipment Under Test (EUT)	Remote Radio Head 2x45W 1900MHz AA190045 RF151032
Applicant	Andrew Corporation
In Accordance With	FCC Part 2 and Part 24, Subpart E ***(Class II Permissive Change)***
Test by	Advanced Compliance Laboratory, Inc. 6 Randolph Way Hillsborough, New Jersey 08844
Authorized by	Wei Li Lab Manager
Signature	
Date	November 10, 2014
AC Lab Report Number	0048-141020-01

Lab Code:200101-0

The test result in this report is supported and covered by the NVLAP accreditation.

Table of Contents

Section 1. Summary of Test Results

Manufacturer:	Andrew Corporation
Product Name:	RRH 2x45W 1900MHz AA190045
Part No.:	RF151032-1C

General: **All measurements are traceable to national standards**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 24, Subpart E.

☐ New Submission ☒ Production Unit

☒ Class II Permissive Change ☐ Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

ORIGINAL GRANT: FCC ID: S8L-AA190045 dated on 07/18/2013

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See "Summary of Test Data"

EUT Change(s): No hardware changes. Additional 15MHz bandwidth carrier, with same output power/modulation, was added via software settings.

NVLAP LAB CODE: 200101-0

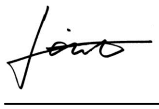
Summary of Test Data

RF Power Output	24.232(a)	1640W EIRP	Complies**
Occupied Bandwidth (Digital)	2.1049(i)	---	Complies
Spurious Emissions at Antenna Terminals	24.238	-13 dBm	Complies
Field Strength of Spurious Emissions	24.238	-13 dBm E.I.R.P.	Complies
Frequency Stability	24.235	0.05 ppm	Complies

** See page 10-18.

The estimated uncertainty of the test result is given as following. The method of uncertainty calculation is provided in Advanced Compliance Lab. Doc. No. 0048-01-01.

	Prob. Dist.	Uncertainty(dB)	Uncertainty(dB)	Uncertainty(dB)
		30-1000MHz	1-6.5GHz	Conducted
Combined Std. Uncertainty u_c	norm.	±2.36	±2.99	±1.83



Wei Li
Lab Manager
Advanced Compliance Lab

Date: November 10, 2014

Section 2. General Equipment Specification

Supply Voltage	-48VDC (extended -39.5VDC to -57VDC)				
Frequency Range	PCS Broad Band	TX/ 1930 – 1995 MHz			
		RX/ 1850 – 1915 MHz			
Modulation	☒ LTE	CDMA/ WCDMA	GSM	EDGE	TDMA
Type of Emissions	G7W/D7W	F9W	GXW	G7W	DXW
Rated Power	45W (46.5dBm) average @ each Tx Port Total two Tx Ports presented with total combined output power: 90W (49.5dBm)				
Operating Power	45W average / Single Carrier 22.5W/ Carrier (2 Carriers)				
Channel BW /Output Impedance	15MHz 50ohm				
Frequency Translation	F1-F1 ☐	F1-F2 ☐	N/A ☒		
	Software ☒	Duplexer Change ☐	Full Band Coverage ☐		

DC voltages and DC currents per 2.1033(c)(8)

The input supply to the Remote Radio Head (RRH) was set at -48 Volts DC. The RF power output was measured with the indicated voltage and current applied into the RRH.

RRH 2x45W 1900MHz AA190045

RF Output, DC Current and RF Input Power are all average values.

Active Mode:
Measured Rated RF output @ each Tx port: 46.5dBm (45W)
Measured DC voltage: -48.0V
Measured DC current: 8.02A.

Standby Mode:
Measured Minimum RF output: -16.4dBm (0.023mW)
Measured DC voltage: -48.0V
Measured DC current: 1.03A

Tune-up procedure per 2.1033(c) (9)

There are no user accessible adjustments or tuning in this EUT. All necessary adjustments and tuning are performed during manufacture of the product. Any adjustments or tuning after service or repair are done as part of that process as special equipment is required to perform such adjustments.

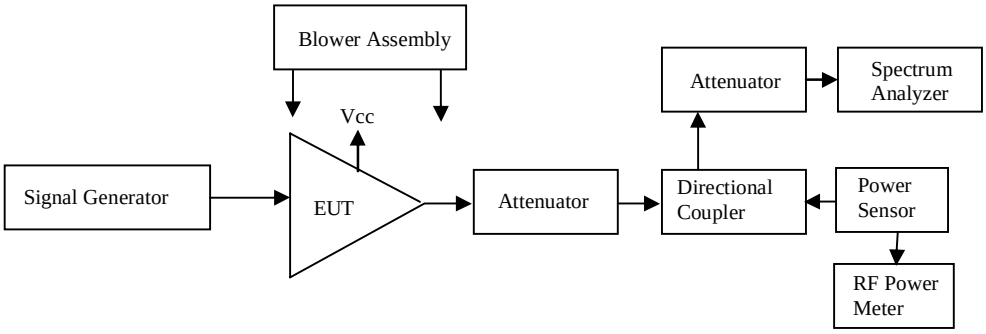
Description of Operation

The EUT operated in FCC 1900MHz band, has two identical sections, each has one RF transmitter & two receivers, a double duplex filter and a dual simplex filter.
All measurements shall be made at room temperature and at nominal DC input voltage unless noted otherwise. All measurements were performed with the EUT configured for maximum transmit power.

System Diagram

See Attachment.

General EUT Setup



TX Waveforms & Operation Frequency Channels for testing:

Waveforms: TM11 (QPSK), TM32 (16QAM) and TM31 (64QAM) *

Carrier Configurations	Frequency	Carrier BW	IBW	Carrier 1 Center Frequency	Carrier 2 Center Frequency	Confirmed
1C	Low	15MHz	15MHz	1937.5MHz	N/A	Y
1C	Middle	15MHz	15MHz	1962.5MHz	N/A	Y
1C	High	15MHz	15MHz	1987.5MHz	N/A	Y
2C	Low	15 & 5 MHz	40MHz	1937.5MHz	1957.5MHz	Y
2C	Middle	15 & 5 MHz	40MHz	1952.5MHz	1972.5MHz	Y
2C	High	15 & 5 MHz	40MHz	1972.5MHz	1992.5MHz	Y
2C	Low	5 & 15 MHz	40MHz	1932.5MHz	1937.5MHz	Y for lower band edge test
2C	High	5 & 15 MHz	40MHz	1987.5MHz	1992.5MHz	Y for higher band edge test

* Same waveforms in original application were used in this application. Based on previous/pre-scan testing results, there is no significant measurement difference between TM32 and TM3. Therefore TM11 & TM31 were chosen for final testing data collection.

Section 3. RF Output Power

Name of Test:	*RF Output Power*	Test Standard:	*24.232(a)*
Tested By:	WEI LI	Test Date:	06/17/2013-06/25/2013

Minimum Standard: Para. No. 24.232(a). The maximum peak output power of base transmitters should not exceed 1640W/MHz EIRP (62.1dBm/MHz).

Para No. 24.232(d). In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Method of Measurement: The manufacturer will provide an external antenna with maximum gain 17.5dBi for this product; hence system EIRP can be calculated per FCC KDB 971168 D01 Power Measurement License Digital Systems V02r2, i.e.

EIRP (dBm/MHz)= RF Output Power at antenna port + 17.5

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

Per 2.1046: The RF Power Output level measured at each antenna port shall be +46.5 dBm (45 watts) +1 dB, -3 dB over the PCS frequency band: 1930-1995 MHz. The tolerance range is per TIA/EIA-97-D, Section 4.3.1.3.

Using power meter, average power measurements shall be taken at the low band edge, mid, and high band edge frequencies for all modulations listed on Page 7.

Per FCC KDB 971168 Sec. 5.7, Peak-to-Average Power Ratio (PAR) shall be measured to meet the <13dB limit.

Test Result: **Complies**

Test Data: Following tables

Rated Output Power – Normal Condition

The inputs are set to generate rated average output power and crest factor for the multi-carrier signals intended.

TX1/RX1 Port TM 11 Waveform (QPSK)

PCS Band	Channel	Modulation	Power Output (dBm)	Rated Power (dBm)	Deviation
Downlink	Low	15MHz LTE 1C	46.30	46.5	-0.20
	Mid	15MHz LTE 1C	46.45	46.5	-0.05
	High	15MHz LTE 1C	46.39	46.5	-0.11
	Low	15 & 5MHz LTE 2C	46.26	46.5	-0.24
	Mid	15 & 5MHz LTE 2C	46.32	46.5	-0.18
	High	15 & 5MHz LTE 2C	46.21	46.5	-0.29
Ref Offset	Ref offset=Cable & Attenuator & Coupler Attenuation=46.68 dB				

TX2/RX2 Port TM 11 Waveform

PCS Band	Channel	Modulation	Power Output (dBm)	Rated Power (dBm)	Deviation
Downlink	Low	15MHz LTE 1C	46.24	46.5	-0.26
	Mid	15MHz LTE 1C	46.47	46.5	-0.03
	High	15MHz LTE 1C	46.36	46.5	-0.14
	Low	15 & 5MHz LTE 2C	46.27	46.5	-0.23
	Mid	15 & 5MHz LTE 2C	46.29	46.5	-0.21
	High	15 & 5MHz LTE 2C	46.28	46.5	-0.22
Ref Offset	Ref offset=Cable & Attenuator & Coupler Attenuation=46.68 dB				

TX1/RX1 Port TM31 Waveform (64 QAM)

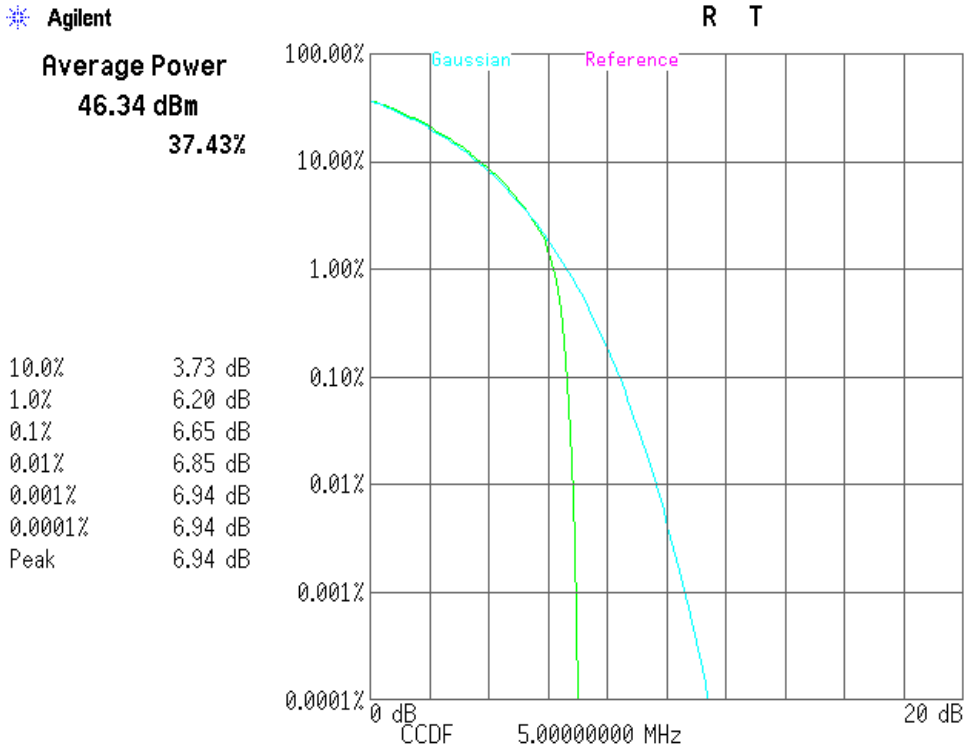
PCS Band	Channel	Modulation	Power Output (dBm)	Rated Power (dBm)	Deviation
Downlink	Low	15MHz LTE 1C	46.27	46.5	-0.23
	Mid	15MHz LTE 1C	46.43	46.5	-0.07
	High	15MHz LTE 1C	46.34	46.5	-0.16
	Low	15 & 5MHz LTE 2C	46.21	46.5	-0.29
	Mid	15 & 5MHz LTE 2C	46.31	46.5	0.19
	High	15 & 5MHz LTE 2C	46.23	46.5	0.27
Ref Offset	Ref offset=Cable & Attenuator & Coupler Attenuation=46.68 dB				

TX2/RX2 Port TM31 Waveform

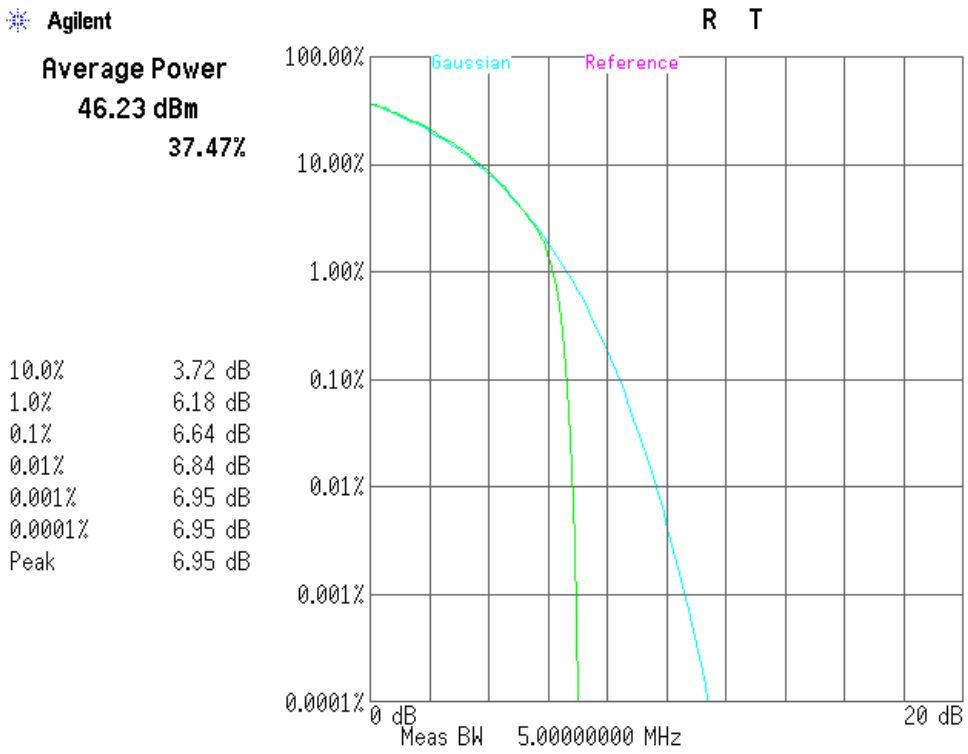
PCS Band	Channel	Modulation	Power Output (dBm)	Rated Power (dBm)	Deviation
Downlink	Low	15MHz LTE 1C	46.14	46.5	-0.36
	Mid	15MHz LTE 1C	46.34	46.5	-0.16
	High	15MHz LTE 1C	46.27	46.5	-0.23
	Low	15 & 5MHz LTE 2C	46.11	46.5	-0.39
	Mid	15 & 5MHz LTE 2C	46.13	46.5	-0.37
	High	15 & 5MHz LTE 2C	46.10	46.5	-0.40
Ref Offset	Ref offset=Cable & Attenuator & Coupler Attenuation=46.68 dB				

Same Waveforms used in both original application and current application: PAR Measurements from pretest for reference.

TM 11 Waveform

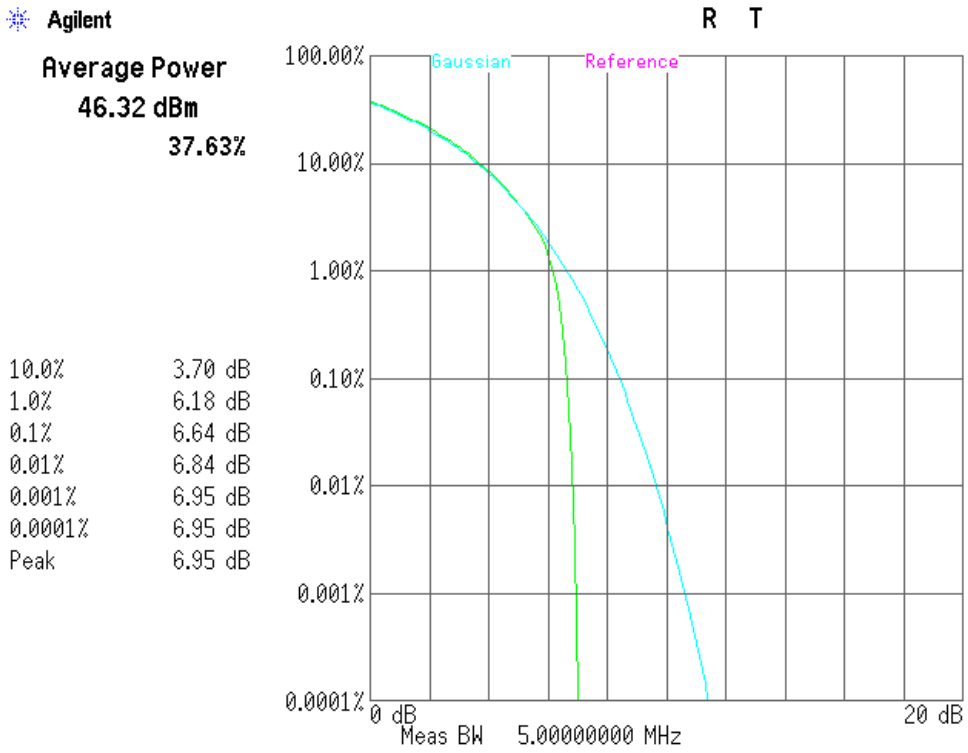


TM 31 Waveform


Agilent
R T
Average Power
46.23 dBm
37.47%
10.0% 3.72 dB
1.0% 6.18 dB
0.1% 6.64 dB
0.01% 6.84 dB
0.001% 6.95 dB
0.0001% 6.95 dB
Peak 6.95 dB
100.00%
10.00%
1.00%
0.10%
0.01%
0.001%
0.0001%
Gaussian
Reference
0 dB
20 dB
Meas BW 5.00000000 MHz

Spectrum Analyzer PAR Measurements (Continued)

TM 32 Waveform



RF Output Power versus DC Input Voltage

(Mid-Band Frequency)

TX1/RX1 Port TM 11

Carrier/Voltage	-39.5V	-48V	-57V
15M LTE 1C	46.50	46.53	46.51
15 & 5M LTE 2C	46.33	46.33	46.32

TX2/RX2 Port TM 11

Carrier/Voltage	-39.5V	-48V	-57V
15M LTE 1C	46.45	46.47	46.46
15 & 5M LTE 2C	46.28	46.29	46.30

TX1/RX1 Port TM 31

Carrier/Voltage	-39.5V	-48V	-57V
15M LTE 1C	46.30	46.34	46.31
15 & 5M LTE 2C	46.27	46.30	46.28

TX2/RX2 Port TM 31

Carrier/Voltage	-39.5V	-48V	-57V
15M LTE 1C	46.42	46.43	46.44
15 & 5M LTE 2C	46.31	46.29	46.27

EIRP POWER CALCULATIONS:

Max EIRP at TX output port for 15MHz LTE case,
To calculate the spectral power in 1MHz, the following conversion must be made:
10 * LOG (15MHz / 1MHz) = 11.7 dB
Therefore, 46.47 – 11.7 = 34.77dBm/MHz.
Antenna's gain is 17.5dBi,
EIRP = 34.77 + 17.5 = 52.27 dBm/MHz
FCC limit is 1640W/MHz = 62.1dBm/MHz

Conclusion:

The two individual TX ports delivered the similar output RF power levels, 46.47dBm (44.36W) and 46.45dBm (44.16W). Each meets FCC power limit requirement based on the above calculation result.

Total combined Power=44.36W+44.16W=88.52W, ie. 49.47 dBm.
EIRP(total)=(49.47-11.7)+17.5=55.27dBm, which is still under FCC limit (62.1dBm).

Considering the identical design between TX1 and TX2 RF paths, one of TX ports was chosen for completed testing suite. Selected tests were also performed on 2nd Tx port.

Section 4. Occupied Bandwidth

Name of Test:	*Occupied Bandwidth*	Test Standard:	*2.1049(i)*
Tested By:	WEI LI	Test Date:	10/30/2014-11/04/2014

Minimum Standard: Not defined by FCC. Input vs. Output.

Method of Measurement: Spectrum Analyzer Settings:
RBW: 200kHz
VBW: ≥3RBW
Span: As required
Sweep: Auto
Detector: Sampling
Input Signal Characteristics: Generated from Digital Input
RF level: Rated, recommended by manufacturer

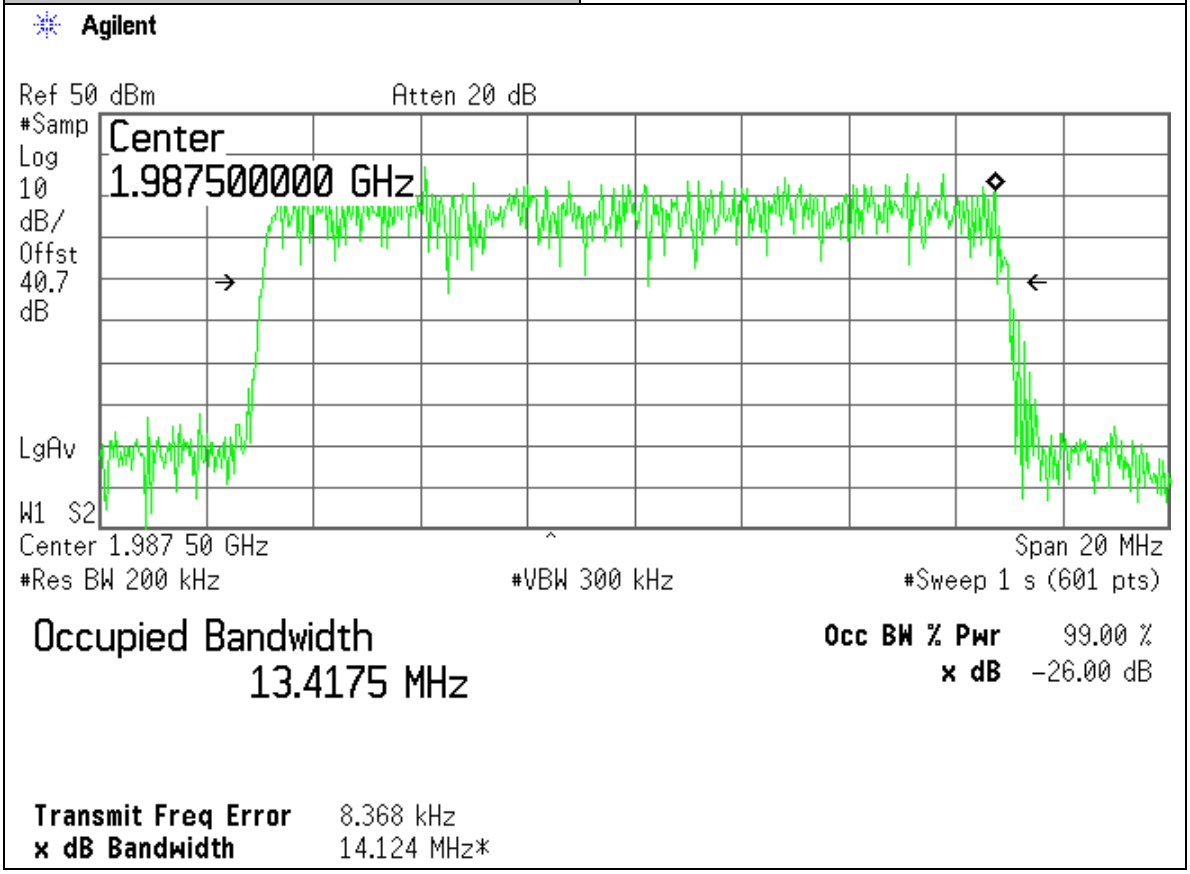
Test Result: **Complies**

Test Data: Attached Plots

BW Configuration	Max. Measured 99% OBW (MHz)
15MHz	13.4259

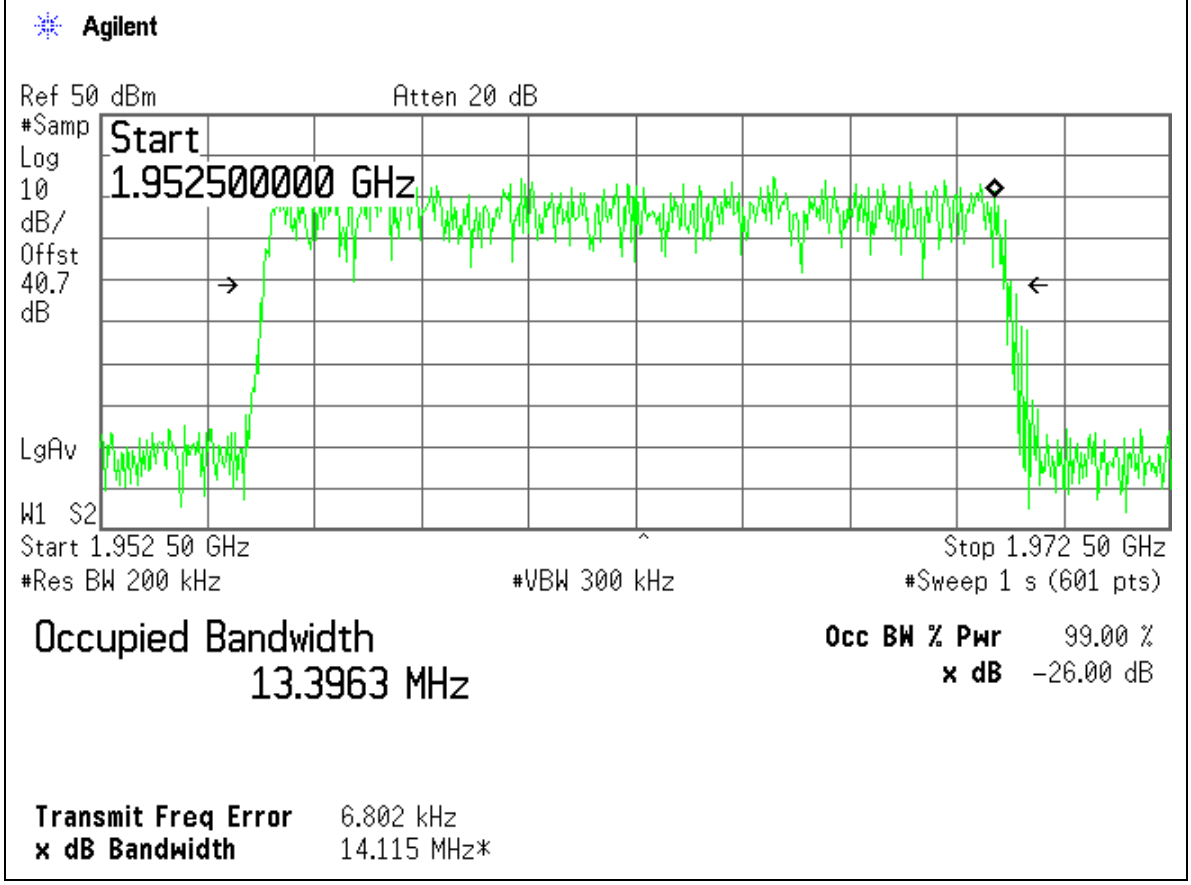
Project Number:	0048-141020-01
EUT:	AA190045
PART NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Occupied Bandwidth: PCS Bands
Plot Name:	Downlink, Hi-Channel, LTE TM 11 Modulation
Configuration:	Input: Digital, Output: TX1 RF OUTPUT 15MHz Carrier Bandwidth



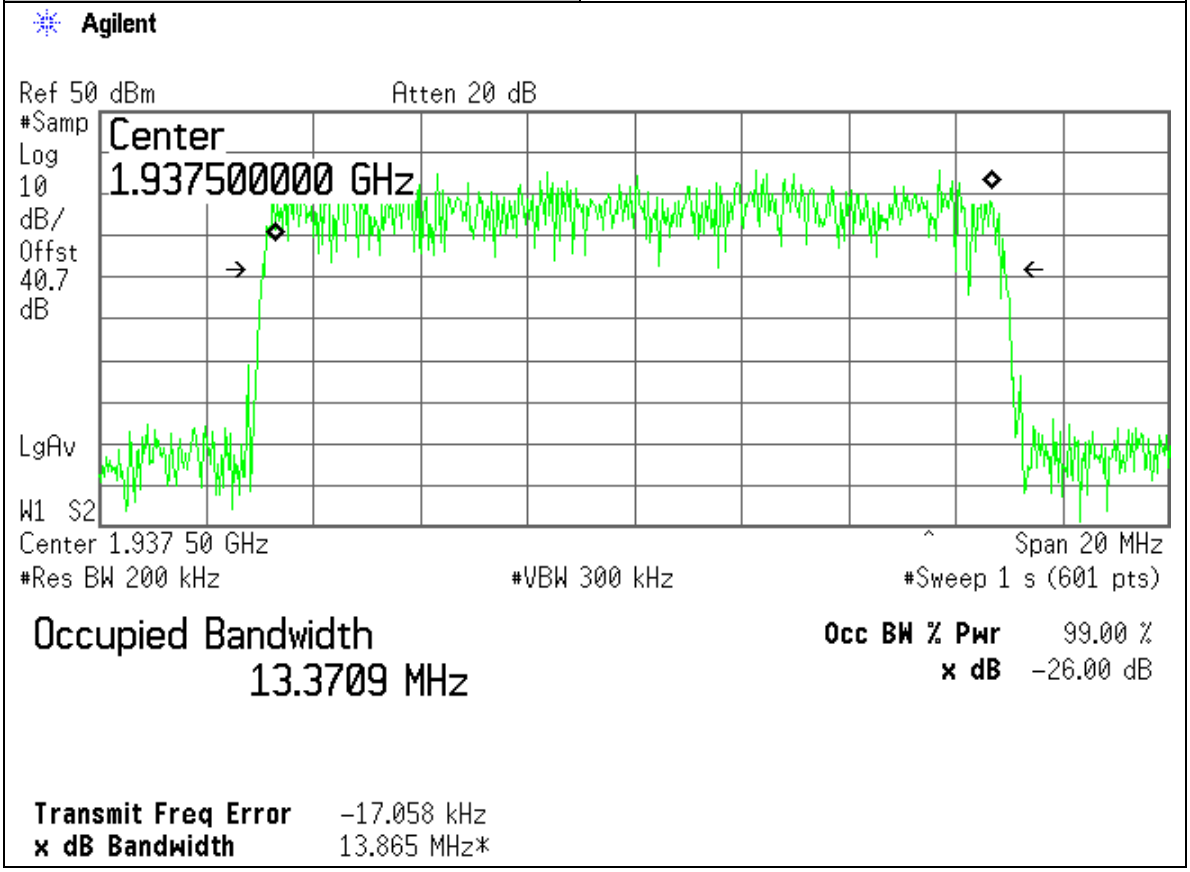
Project Number:	0048-141020-01
EUT:	AA190045
PART NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Occupied Bandwidth: PCS Bands
Plot Name:	Downlink, Mid-Channel, LTE TM 11 Modulation
Configuration:	Input: Digital, Output: TX1 RF OUTPUT 15MHz Carrier Bandwidth



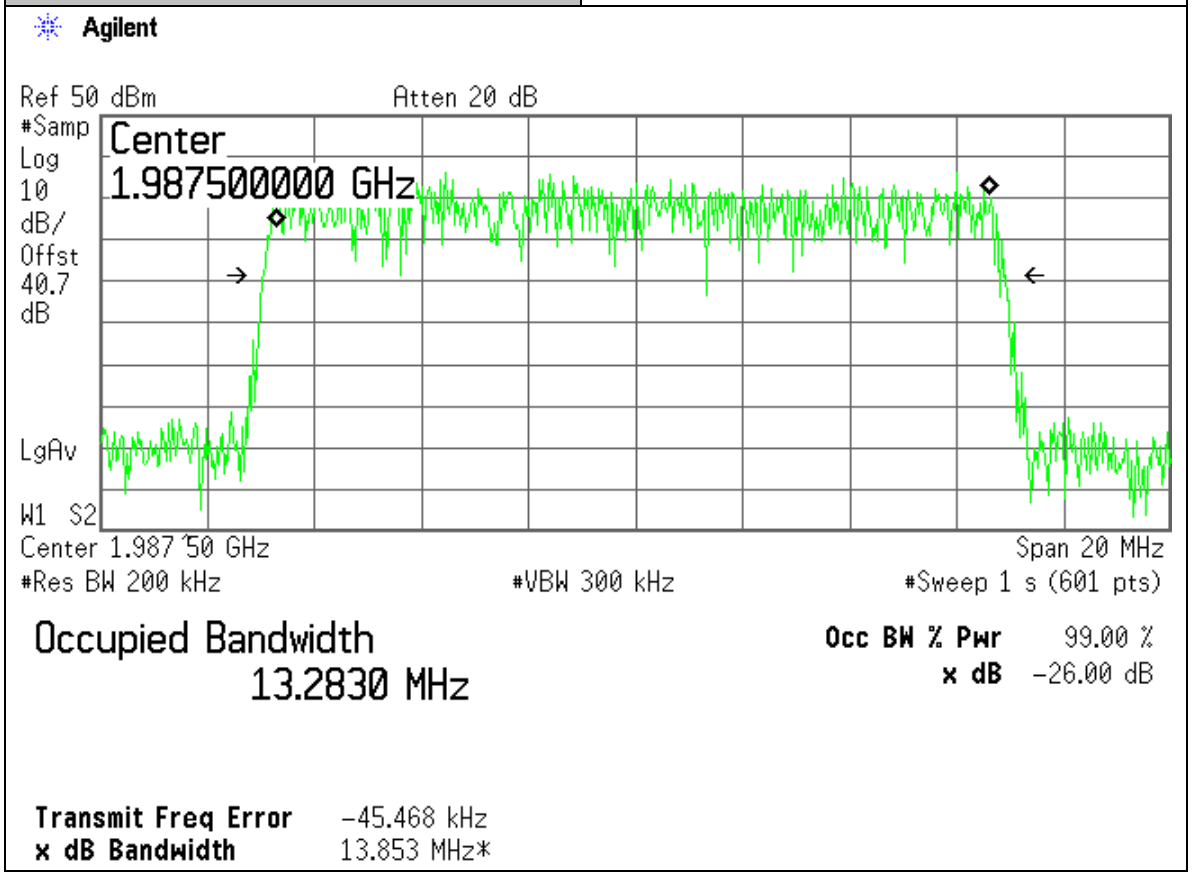
Project Number:	0048-141020-01
EUT:	AA190045
PART NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Occupied Bandwidth: PCS Bands
Plot Name:	Downlink, Low-Channel, LTE TM11 Modulation
Configuration:	Input: Digital, Output: TX1 RF OUTPUT 15 MHz Carrier Bandwidth



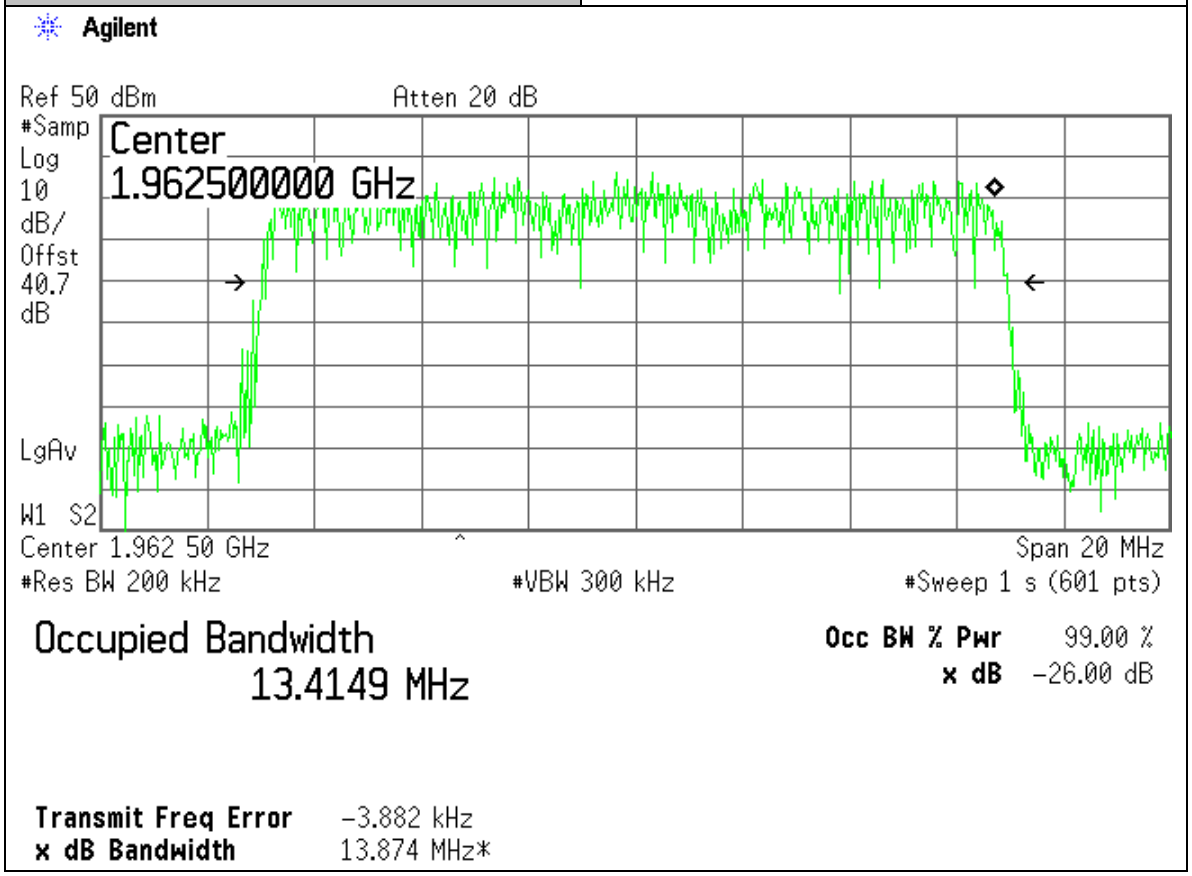
Project Number:	0048-141020-01
EUT:	AA190045
PART NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Occupied Bandwidth: PCS Bands
Plot Name:	Downlink, Hi-Channel, LTE TM 11 Modulation
Configuration:	Input: Digital, Output: TX2 RF OUTPUT 15MHz Carrier Bandwidth



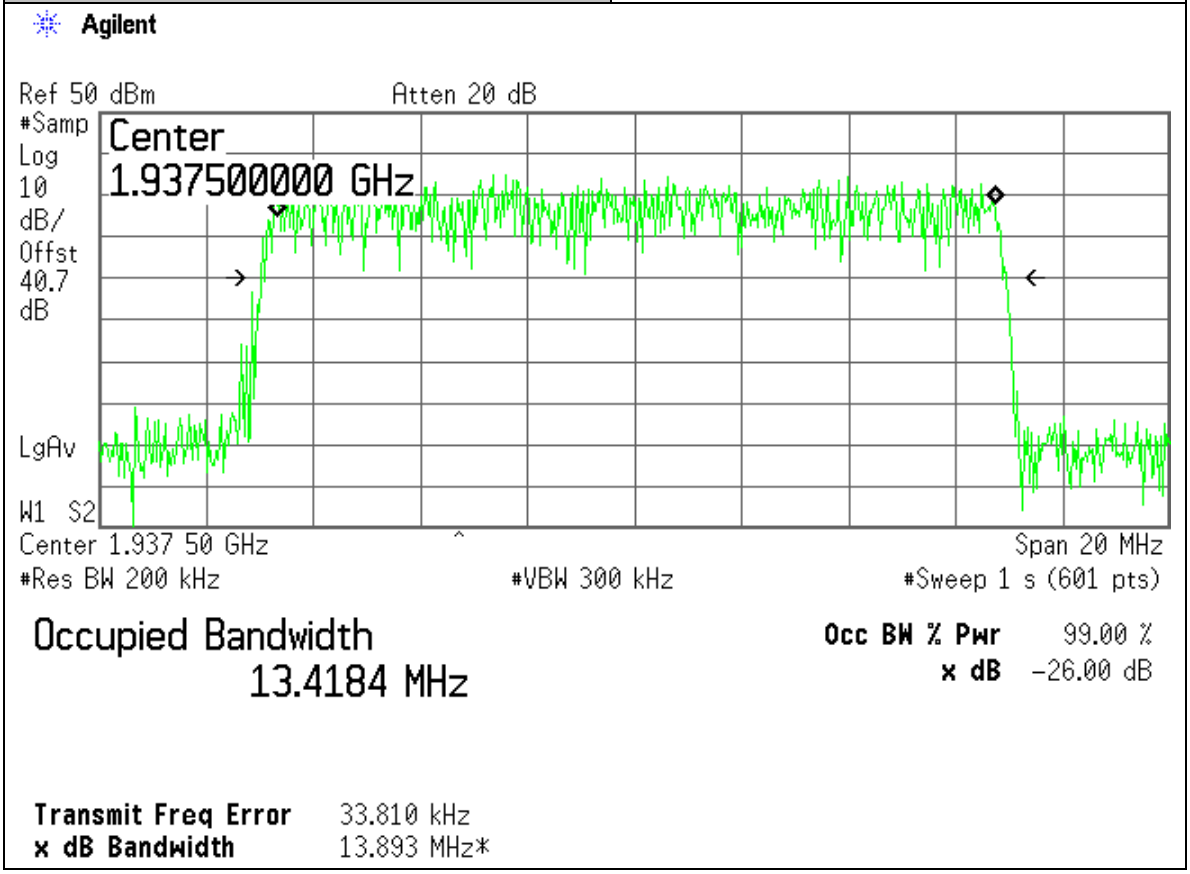
Project Number:	0048-141020-01
EUT:	AA190045
PART NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Occupied Bandwidth: PCS Bands
Plot Name:	Downlink, Mid-Channel, LTE TM 11 Modulation
Configuration:	Input: Digital, Output: TX2 RF OUTPUT 15MHz Carrier Bandwidth



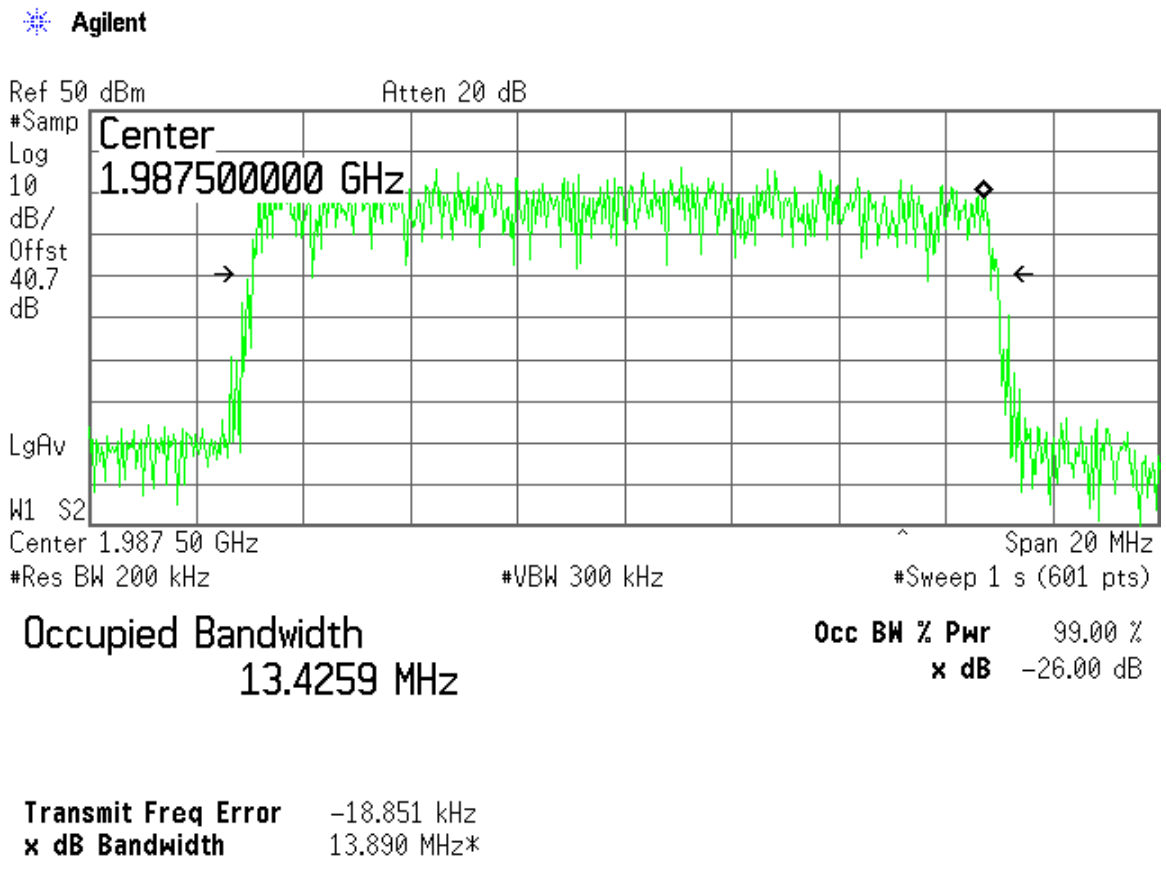
Project Number:	0048-141020-01
EUT:	AA190045
PART NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Occupied Bandwidth: PCS Bands
Plot Name:	Downlink, Low-Channel, LTE TM 11 Modulation
Configuration:	Input: Digital, Output: TX2 RF OUTPUT 15MHz Carrier Bandwidth



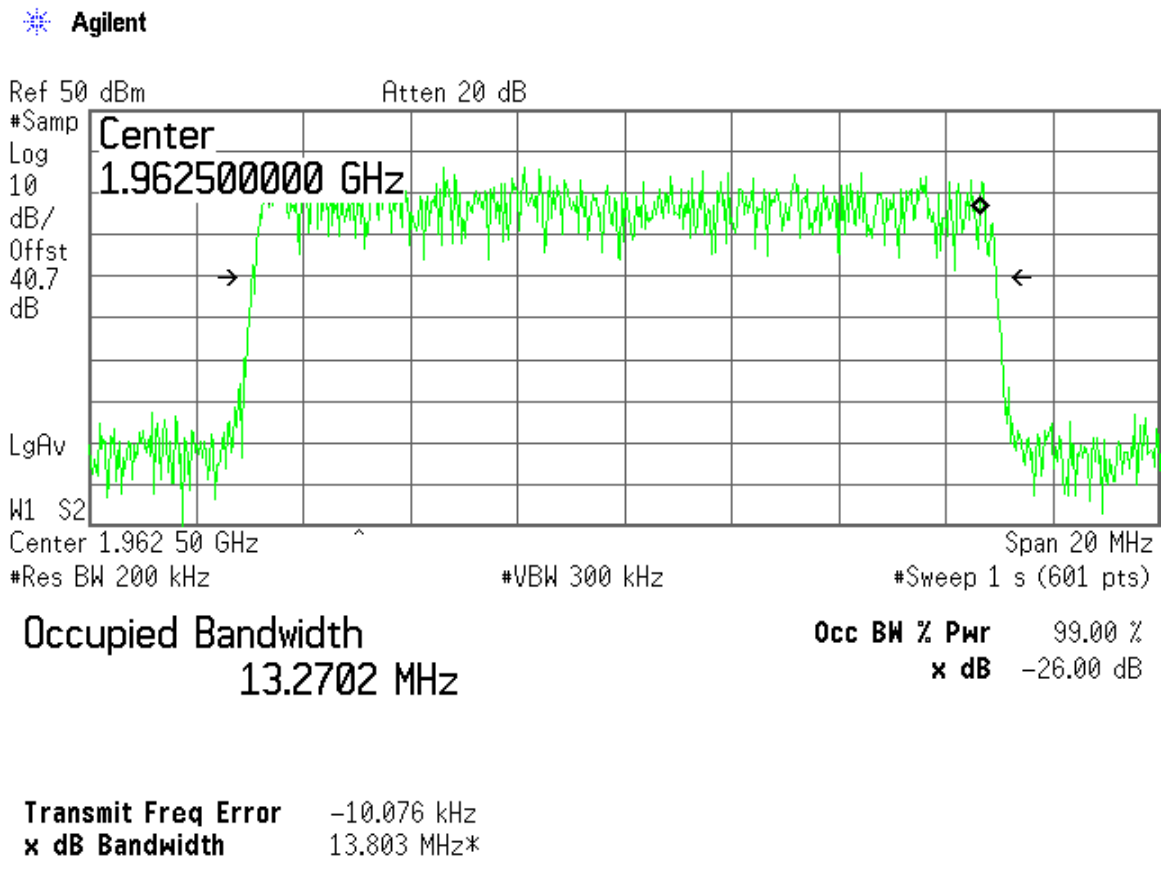
Project Number:	0048-141020-01
EUT:	AA190045
PART NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Occupied Bandwidth: PCS Bands
Plot Name:	Downlink, Hi-Channel, LTE TM 31 Modulation
Configuration:	Input: Digital, Output: TX1 RF OUTPUT 15MHz Carrier Bandwidth



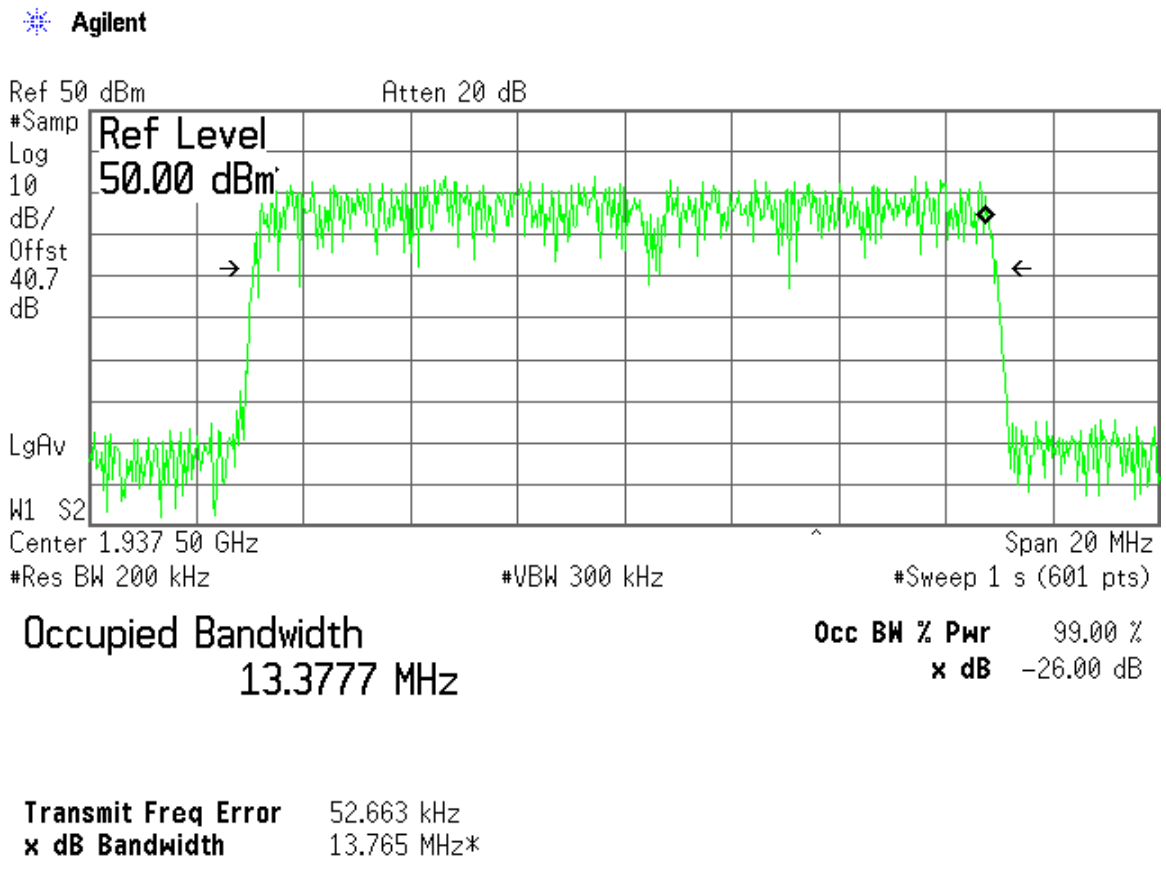
Project Number:	0048-141020-01
EUT:	AA190045
PART NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Occupied Bandwidth: PCS Bands
Plot Name:	Downlink, Mid-Channel, LTE TM 31 Modulation
Configuration:	Input: Digital, Output: TX1 RF OUTPUT 15MHz Carrier Bandwidth



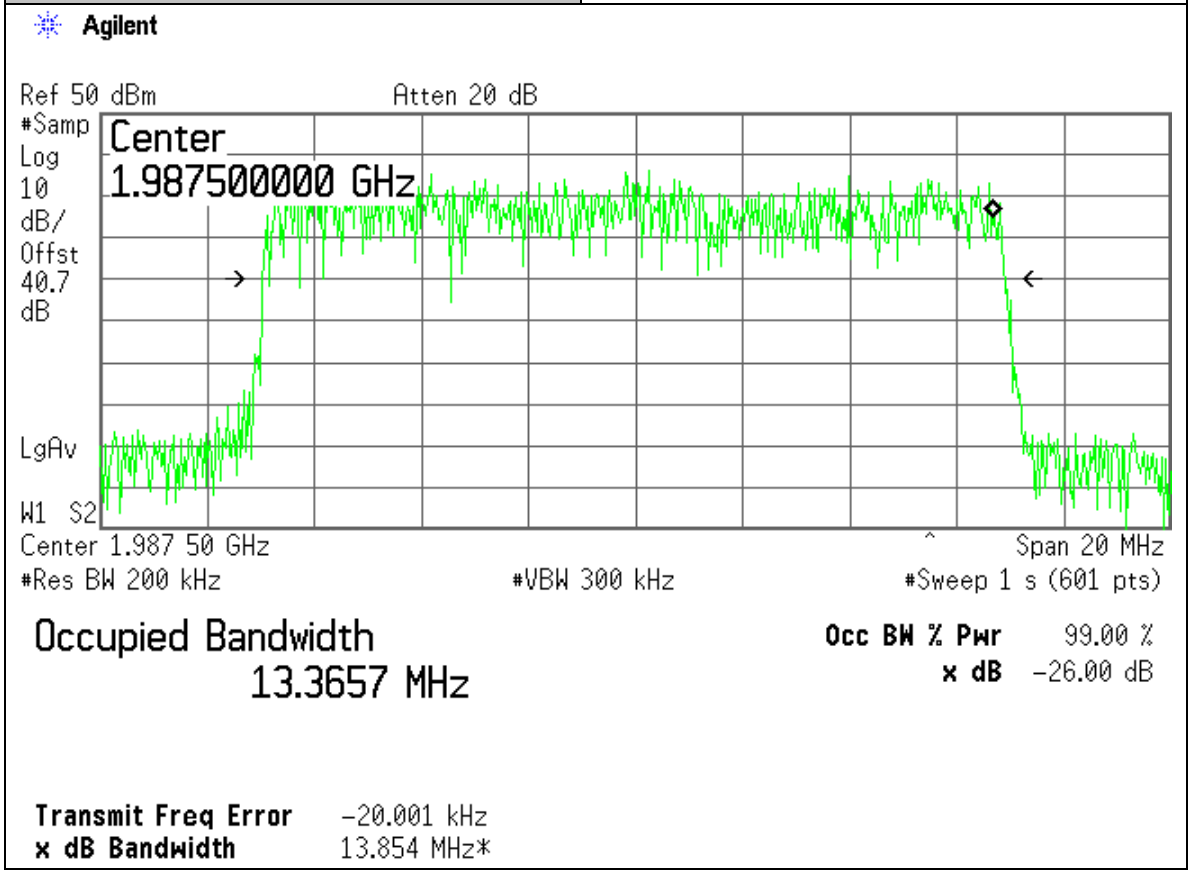
Project Number:	0048-141020-01
EUT:	AA190045
PART NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Occupied Bandwidth: PCS Bands
Plot Name:	Downlink, Low-Channel, LTE TM 31 Modulation
Configuration:	Input: Digital, Output: TX1 RF OUTPUT 15MHz Carrier Bandwidth



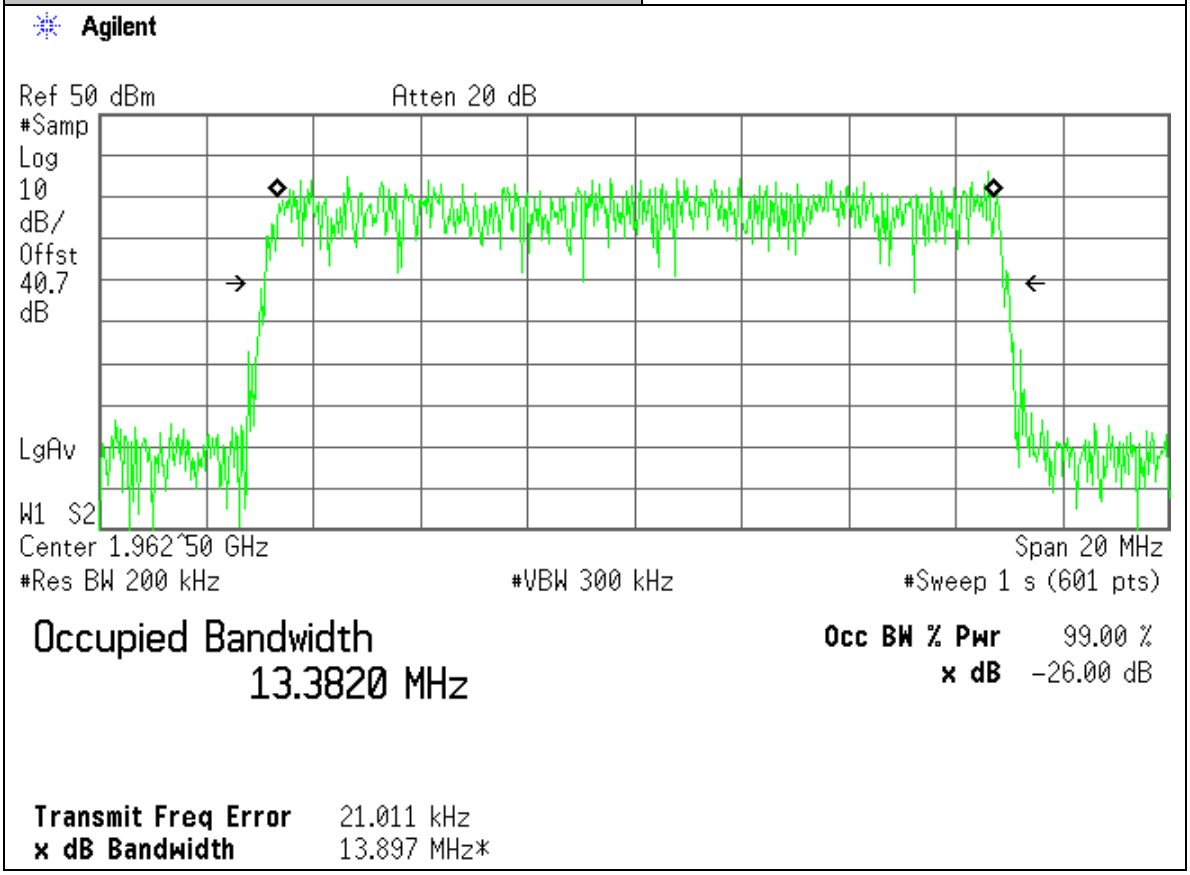
Project Number:	0048-141020-01
EUT:	AA190045
PART NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Occupied Bandwidth: PCS Bands
Plot Name:	Downlink, Hi-Channel, LTE TM 31 Modulation
Configuration:	Input: Digital, Output: TX2 RF OUTPUT 15MHz Carrier Bandwidth



Project Number:	0048-141020-01
EUT:	AA190045
PART NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Occupied Bandwidth: PCS Bands
Plot Name:	Downlink, Mid-Channel, LTE TM 31 Modulation
Configuration:	Input: Digital, Output: TX2 RF OUTPUT 15MHz Carrier Bandwidth



Project Number:	0048-141020-01
EUT:	AA190045
PART NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Occupied Bandwidth: PCS Bands
Plot Name:	Downlink, Low-Channel, LTE TM 31 Modulation
Configuration:	Input: Digital, Output: TX2 RF OUTPUT 15MHz Carrier Bandwidth

Section 5. Spurious Emissions at Antenna Terminals

Name of Test:	*Spurious Emissions at Antenna Terminals*	Test Standard:	*24.238(a)*
Tested By:	WEI LI	Test Date:	06/17/2013-06/25/2013

Minimum Standard: Para. No. 24.238(a). The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall not less than 43+10 log (mean output power in watts) dBc below the mean power output outside a licensee's frequency block (-13dBm).

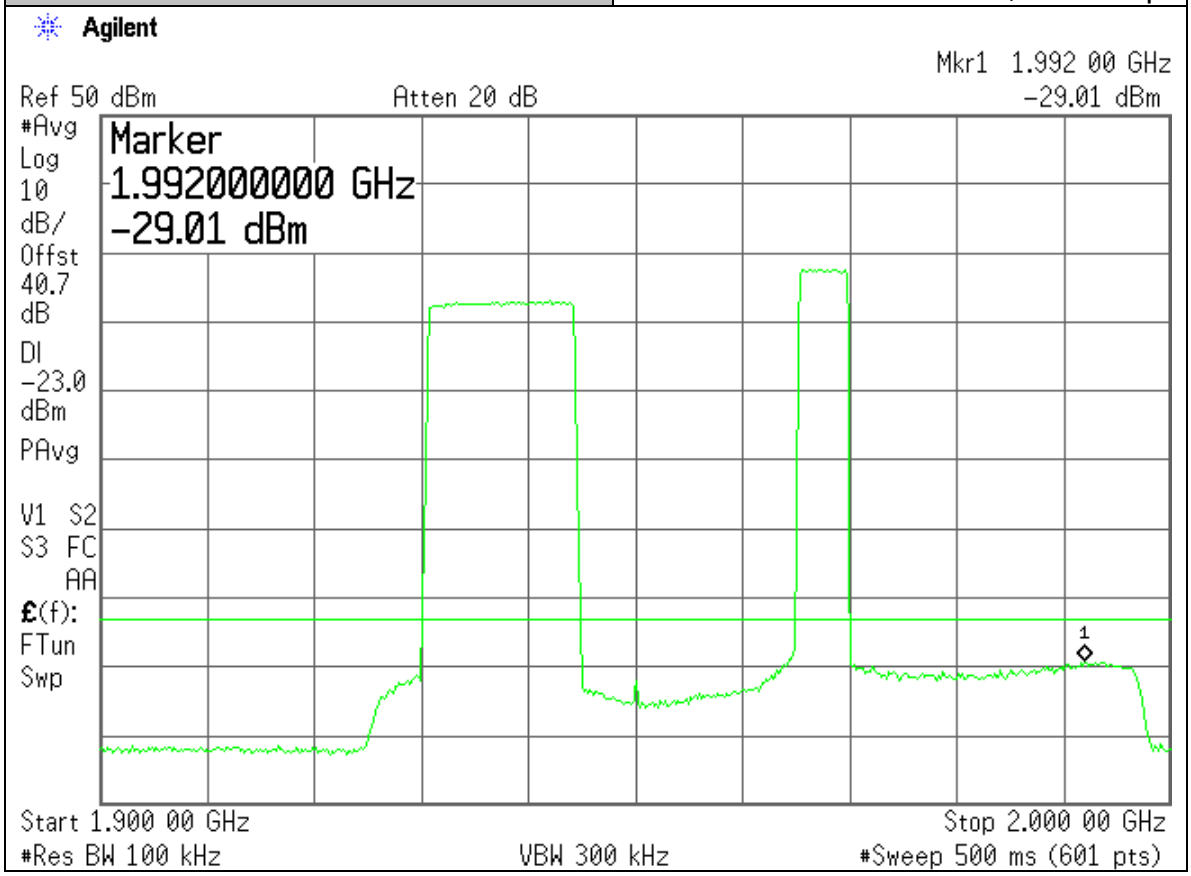
Method of Measurement: Spectrum Analyzer Settings:
RBW: 1MHz (100 kHz RBW for band edge measurement)
VBW: ≥ RBW
Start Frequency: 9KHz or Lowest Clock Frequency
Stop Frequency: 20GHz (PCS)
Sweep: Auto or greater.
Using in-band filter if needed.
For Inter-modulation measurement: 2 carriers RF signals set as inputs per Frequency Table on page 7. The frequencies of RF signals shall be within the unit's operating band The level of both RF input signals shall be increased, until the maximum rated output power per channel, as declared by the manufacturer, is reached.

Test Result: **Complies**

Test Data: Attached Plots

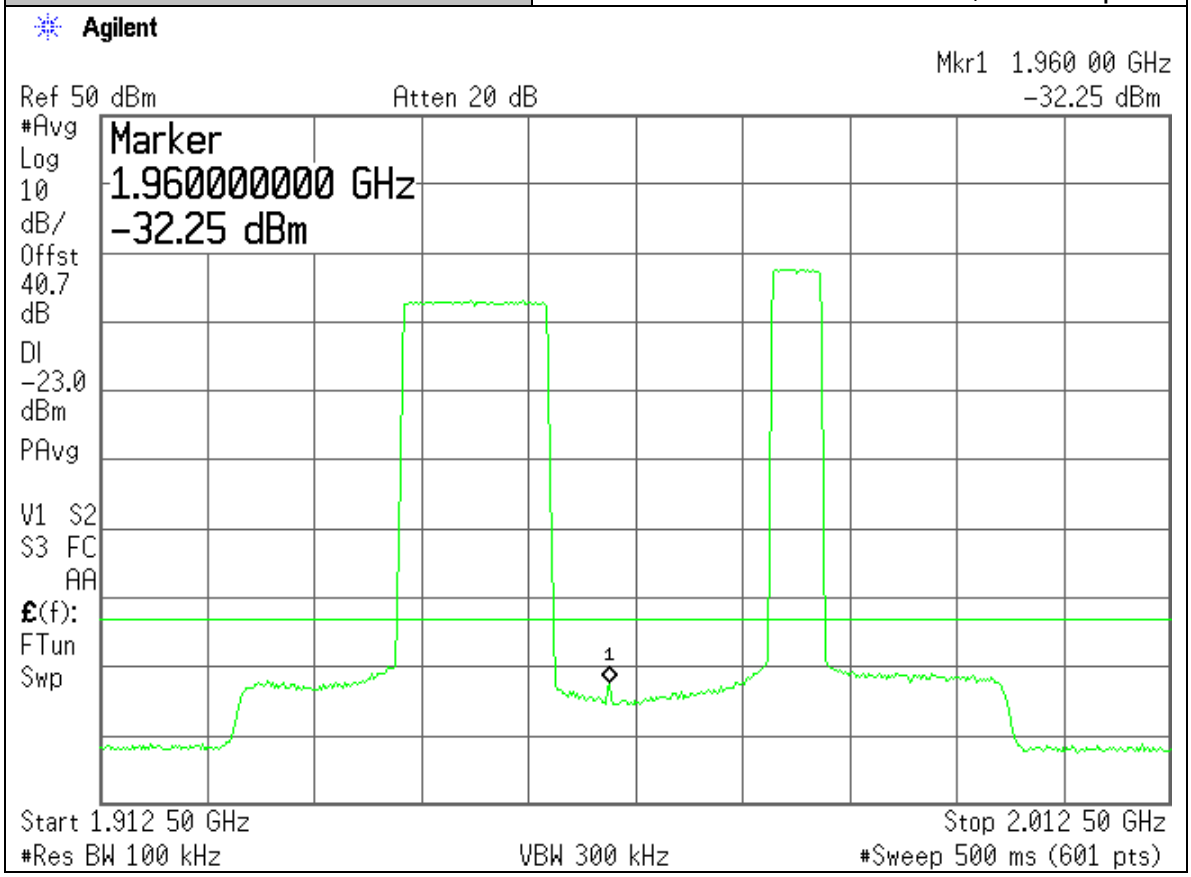
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15 + 5MHz Carriers, Low freq



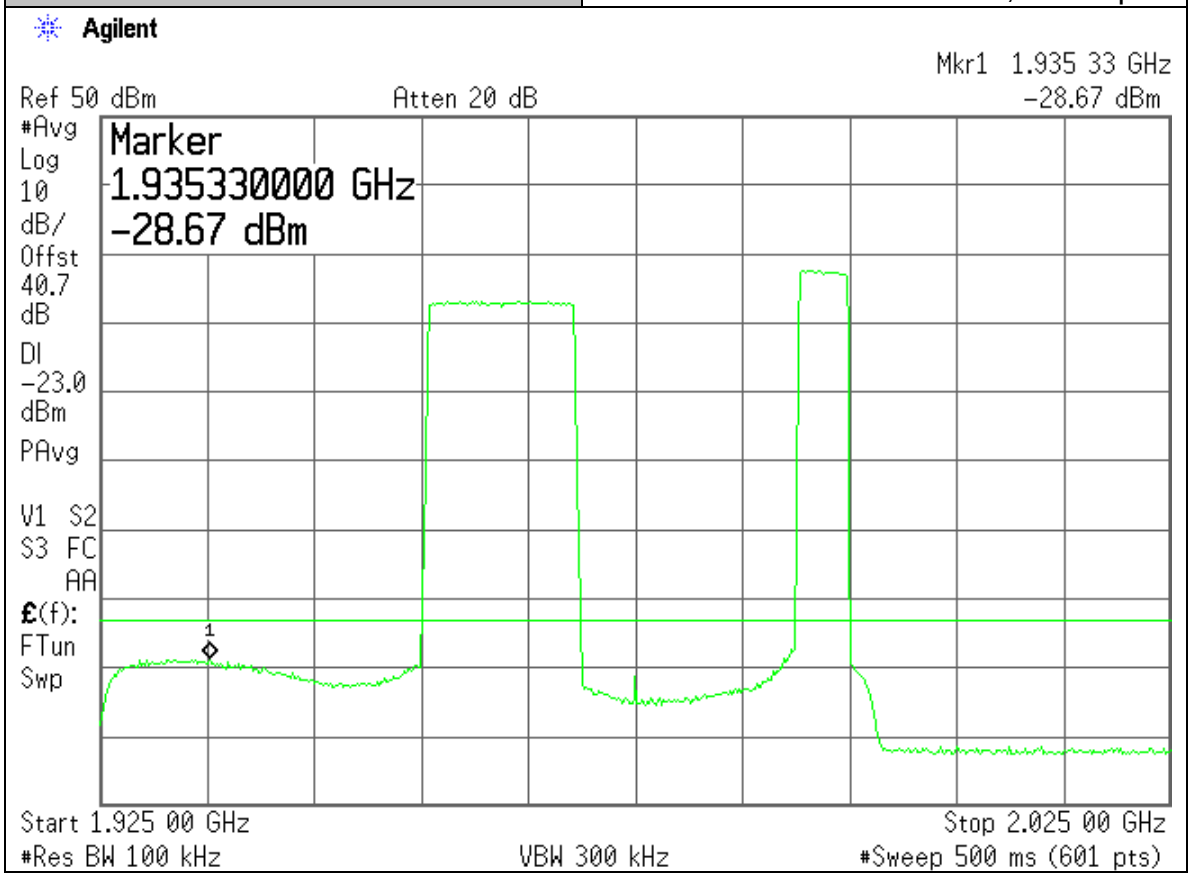
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15 + 5MHz Carriers, Mid freq



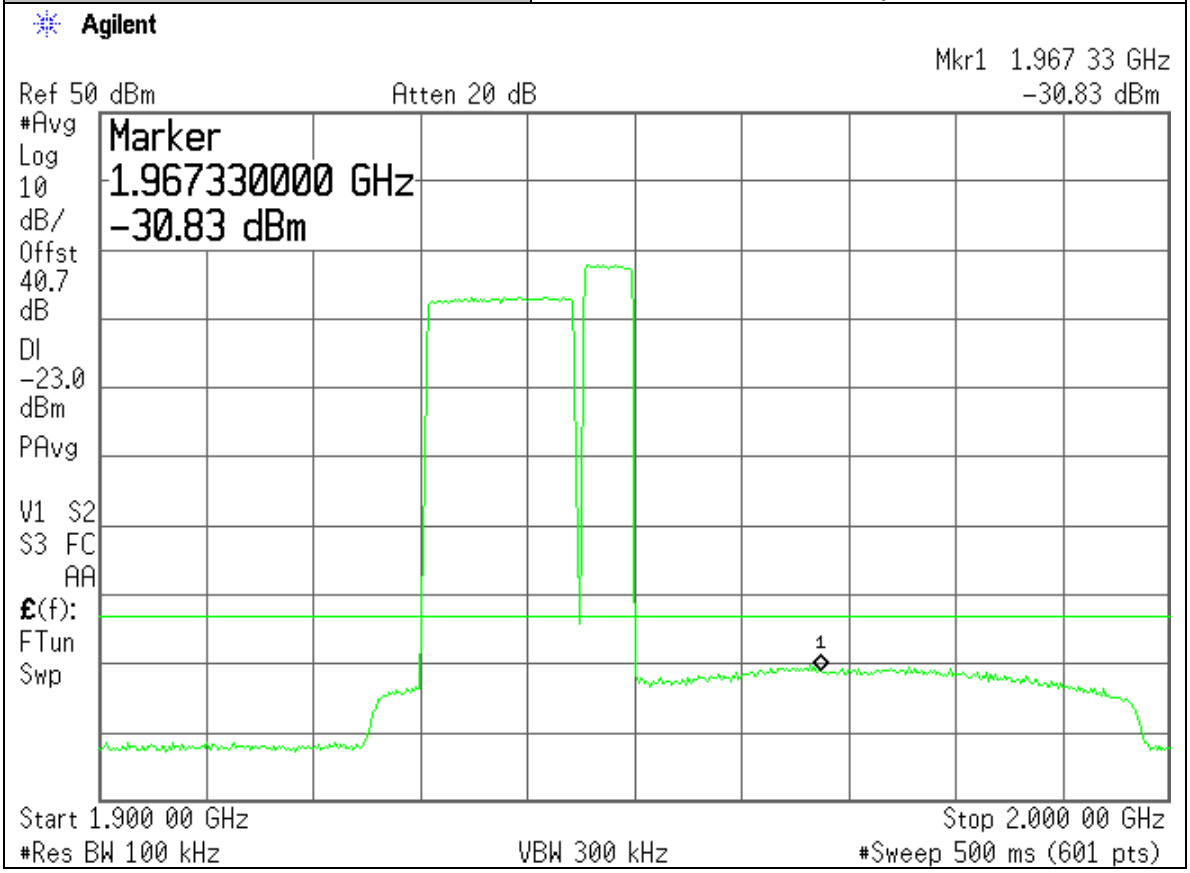
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15 + 5MHz Carriers, Hi freq



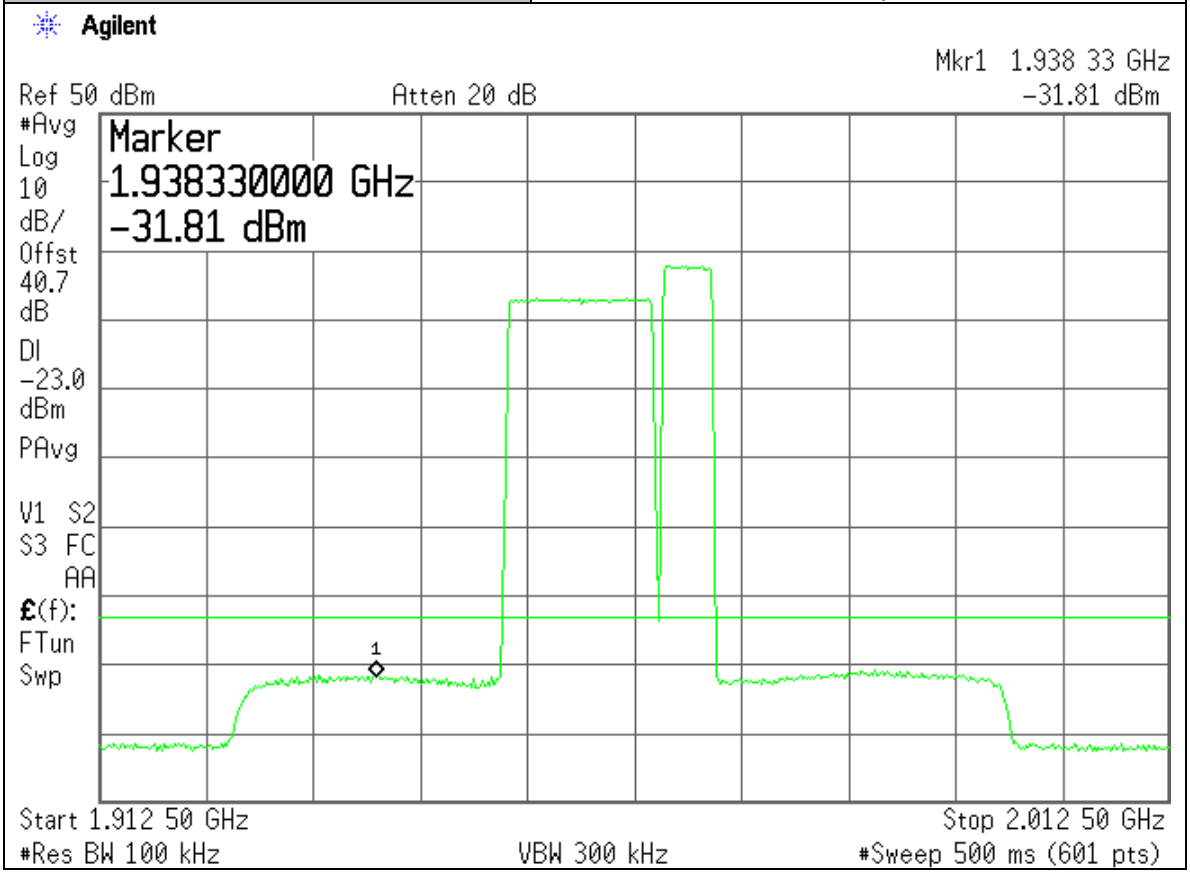
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15 + 5MHz Adjacent Carriers, Low freq



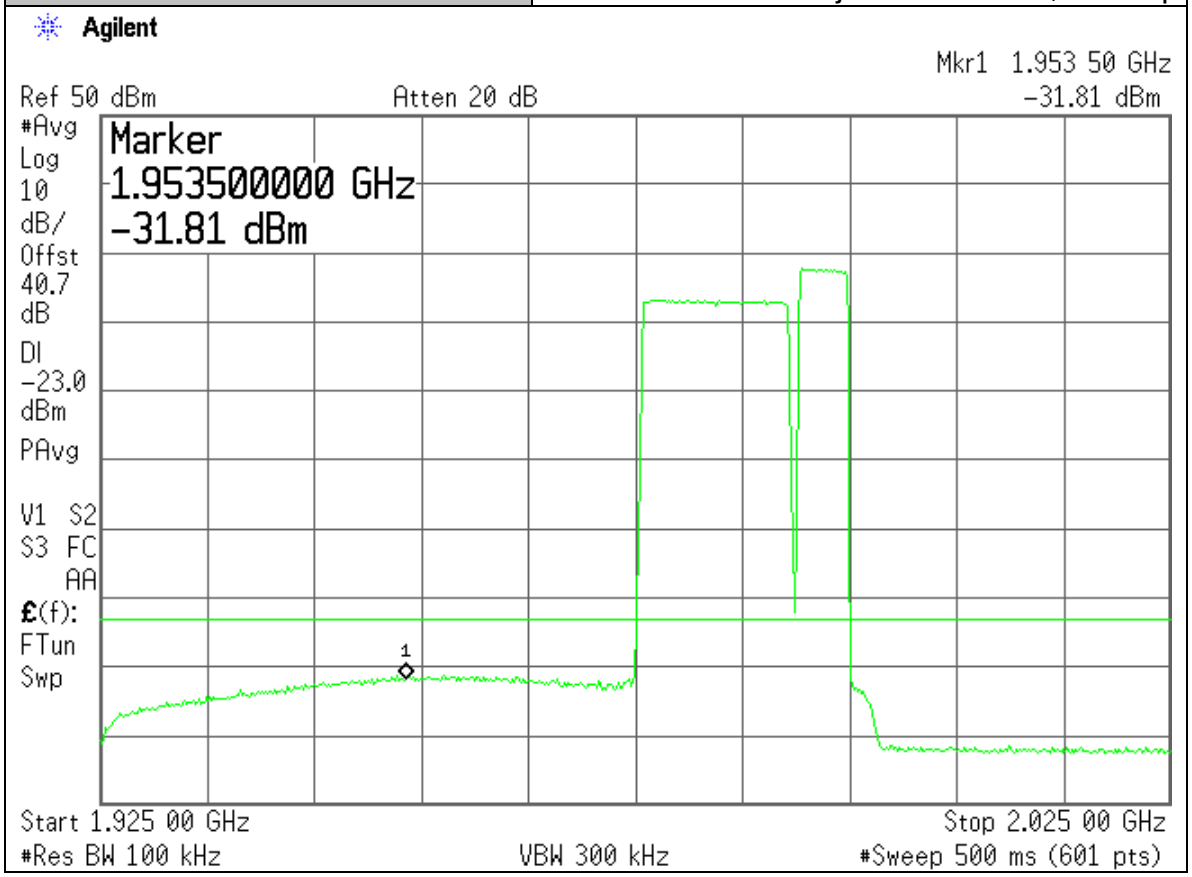
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15 + 5MHz Adjacent Carriers, Mid freq



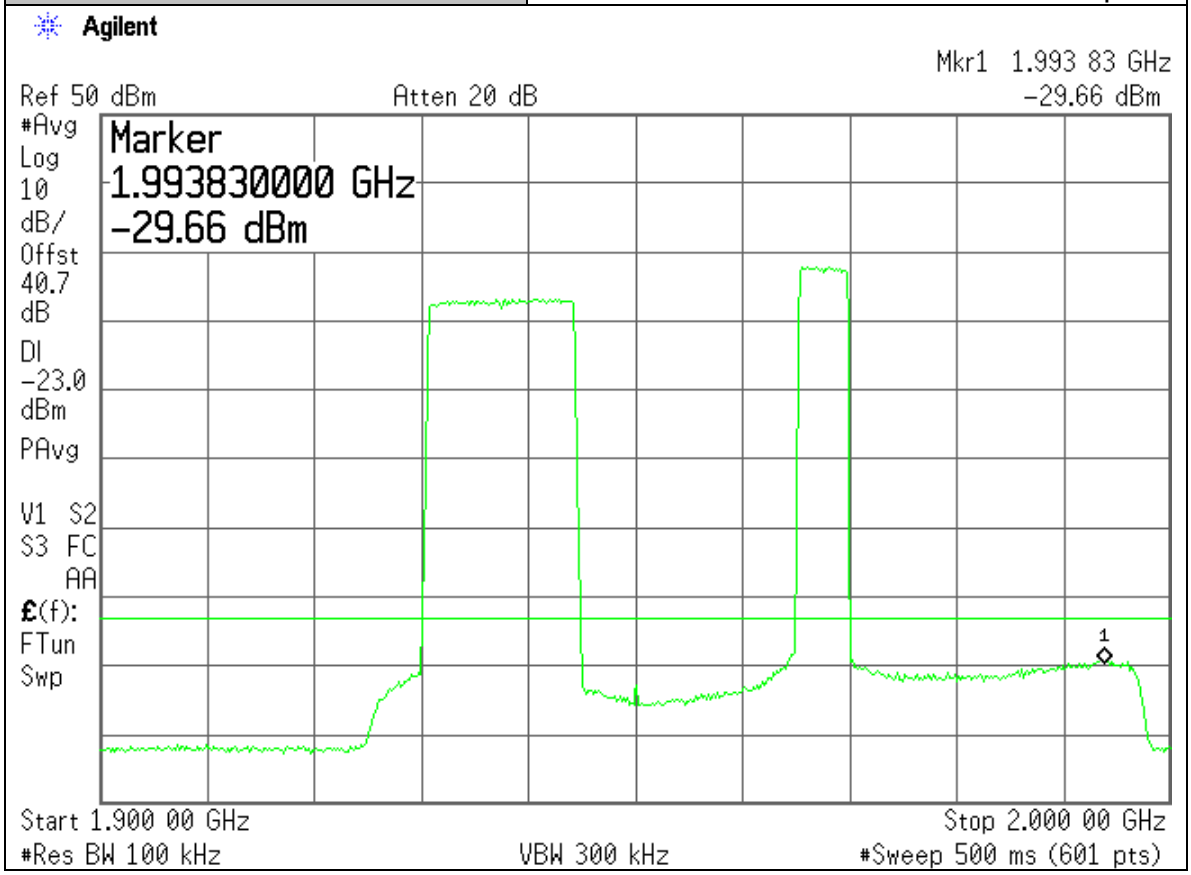
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15 + 5MHz Adjacent Carriers, Hi freq



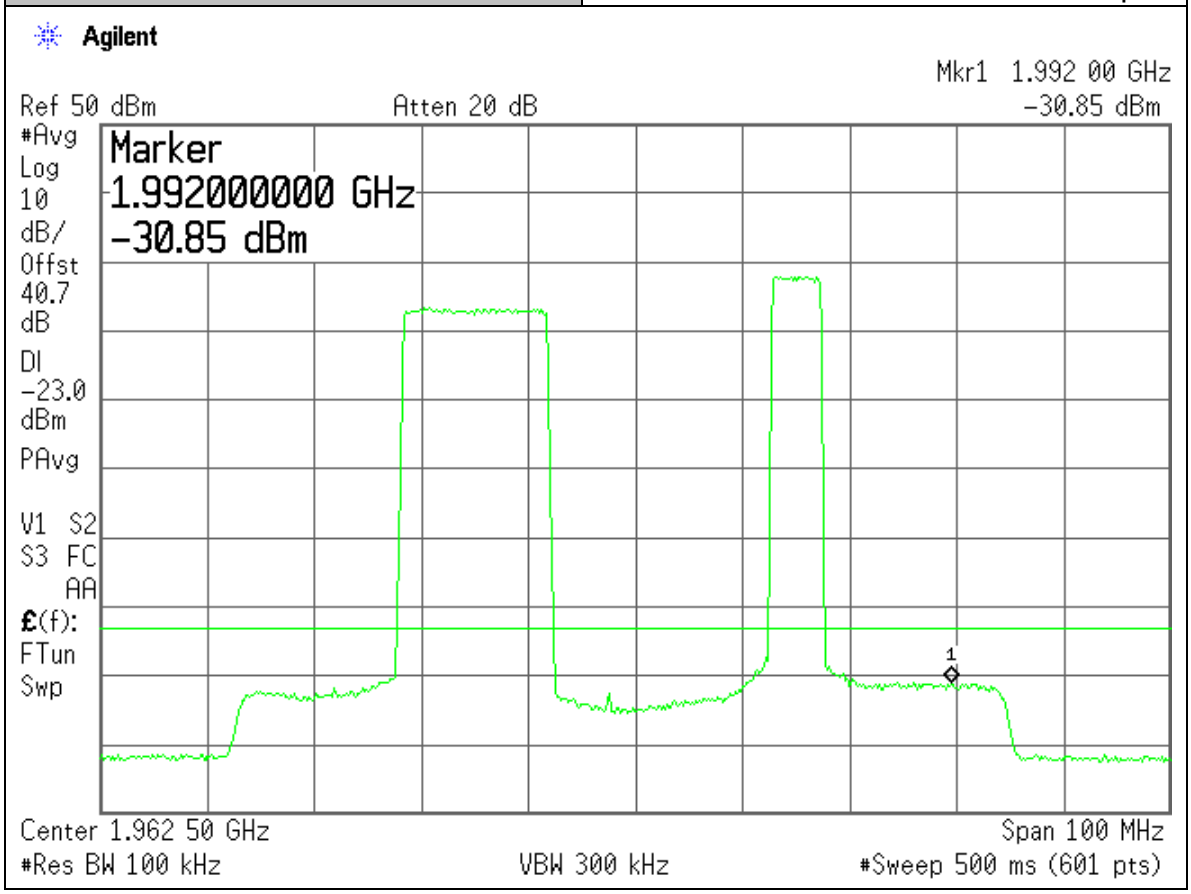
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15 + 5MHz Carriers, Low freq



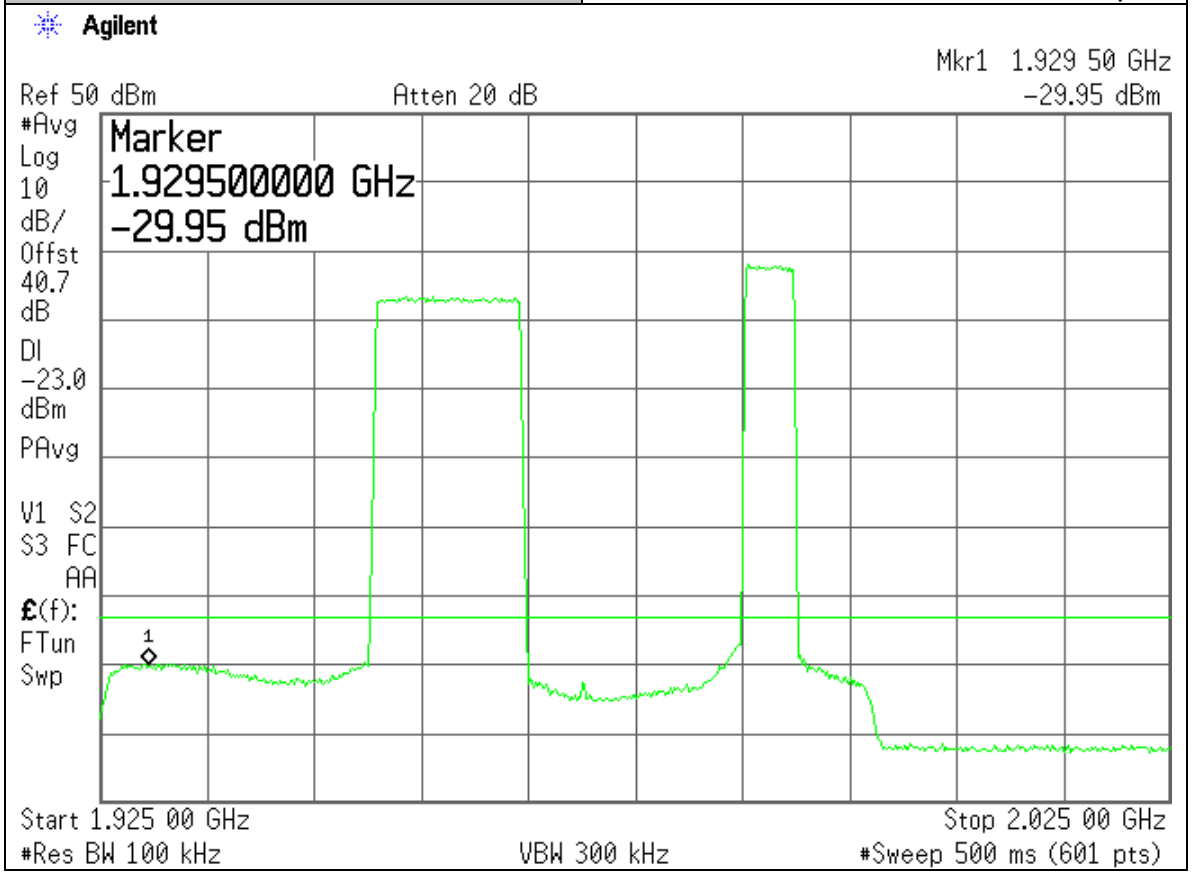
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15 + 5MHz Carrier, Mid freq



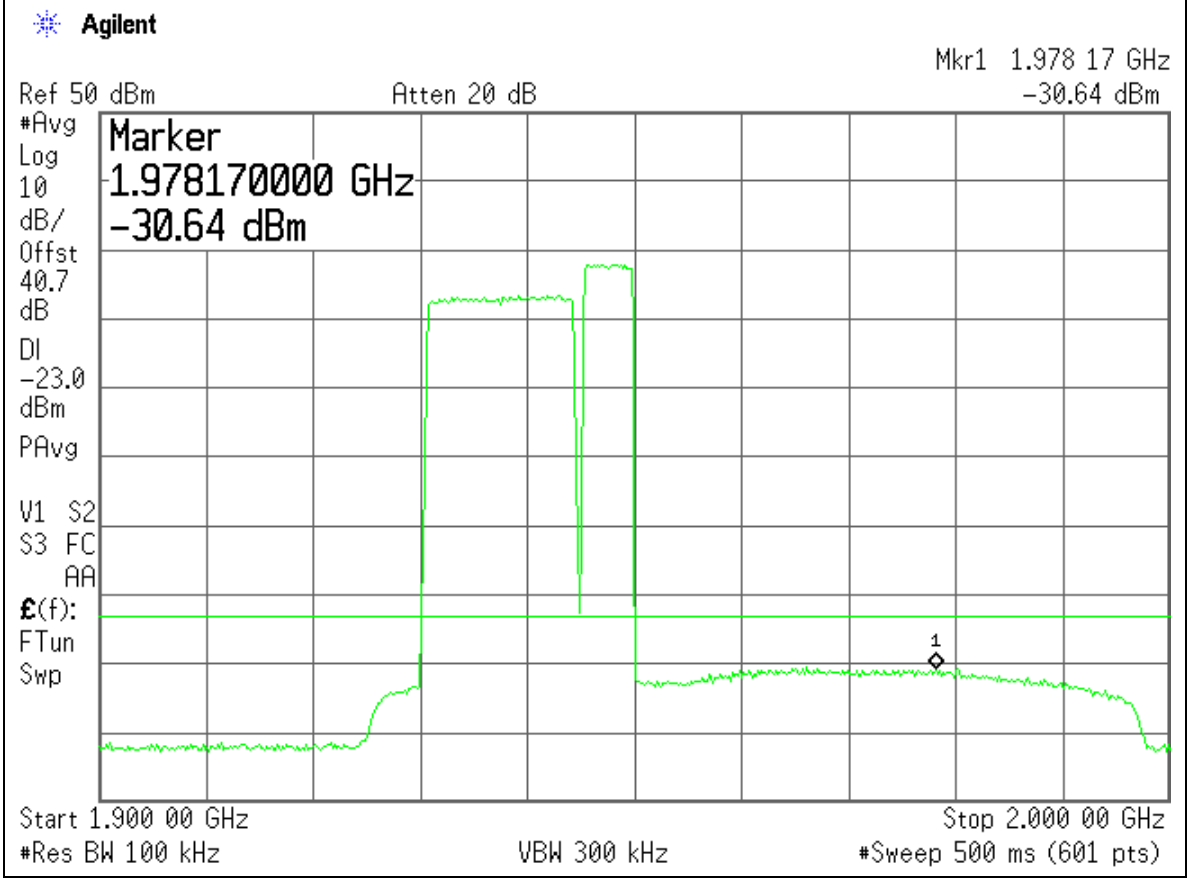
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15 + 5MHz Carriers, Hi freq



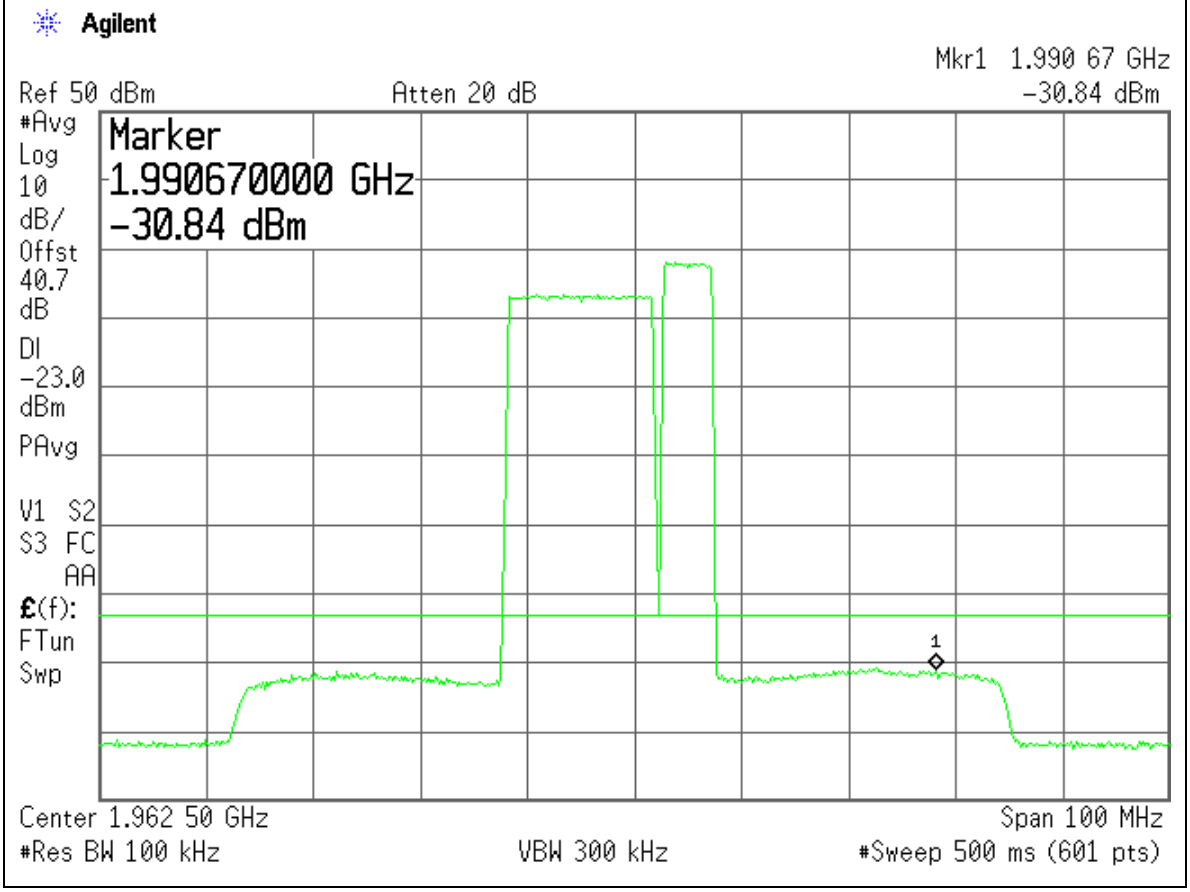
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15 + 5MHz Adjacent Carriers , Low freq



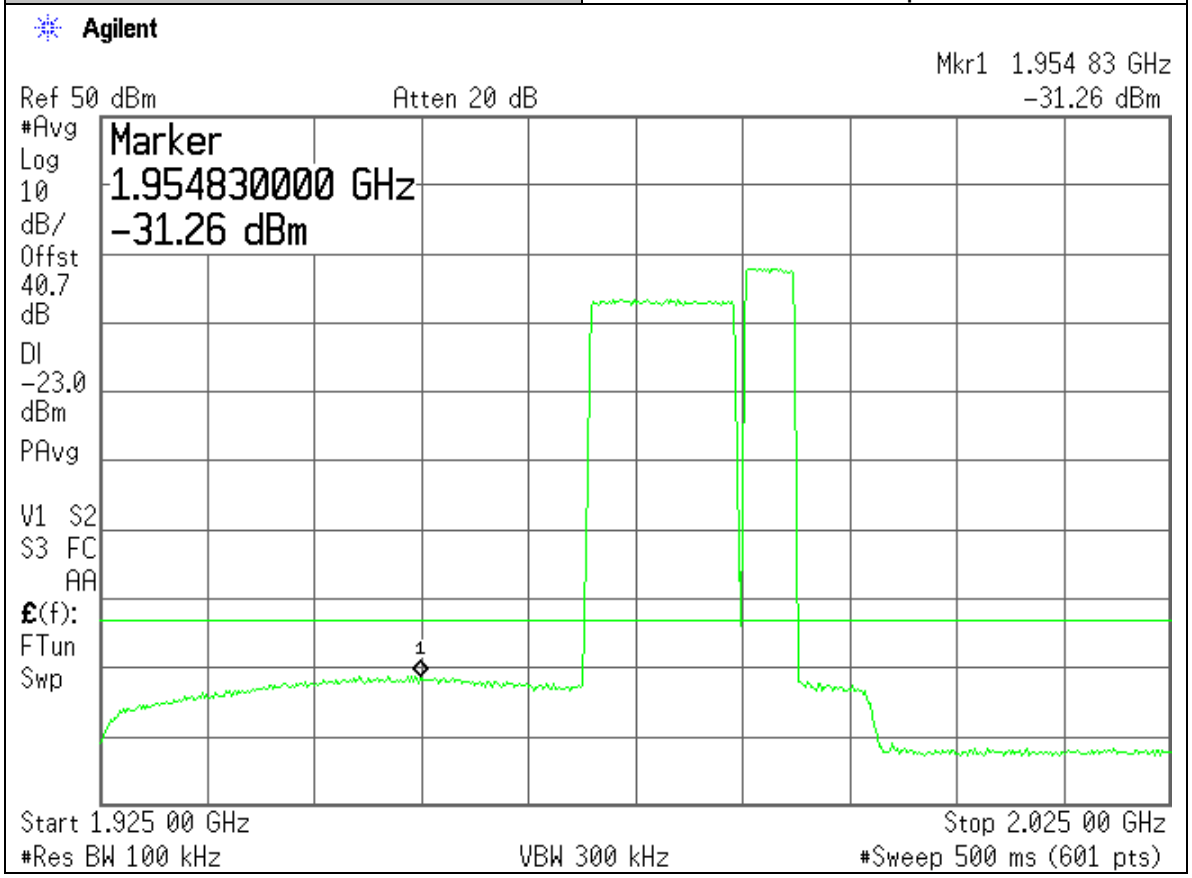
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15 + 5MHz Adjacent Carrier, Mid freq



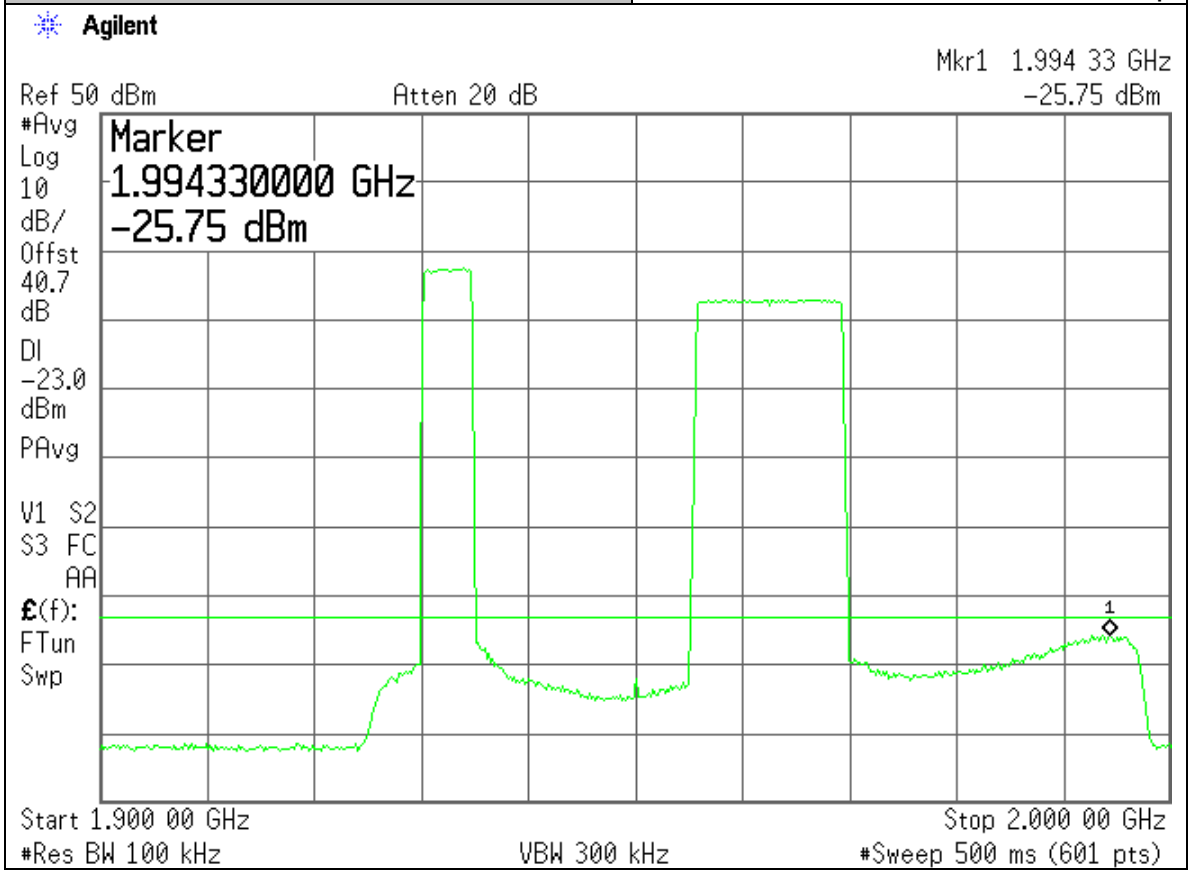
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15 + 5MHz Adjacent Carriers, Hi freq



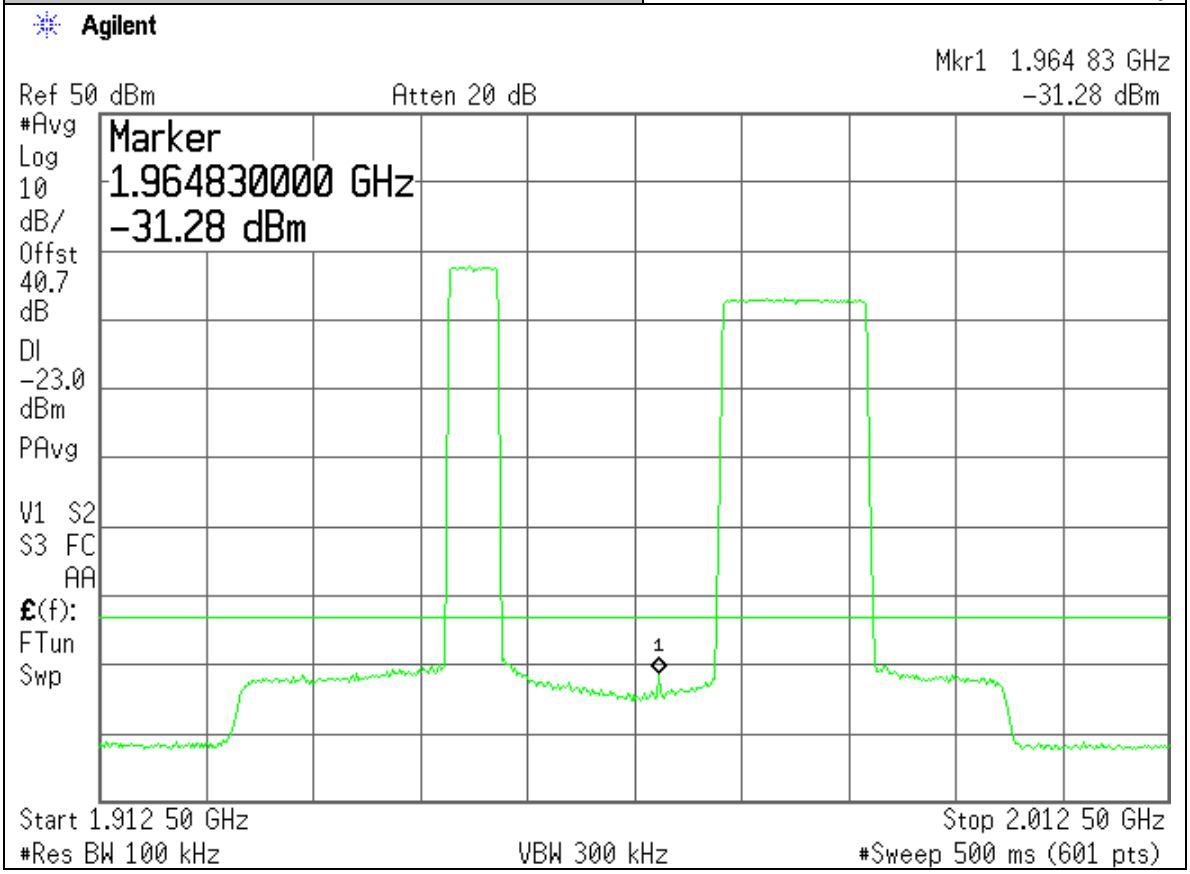
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 5 + 15MHz Carriers, Low freq



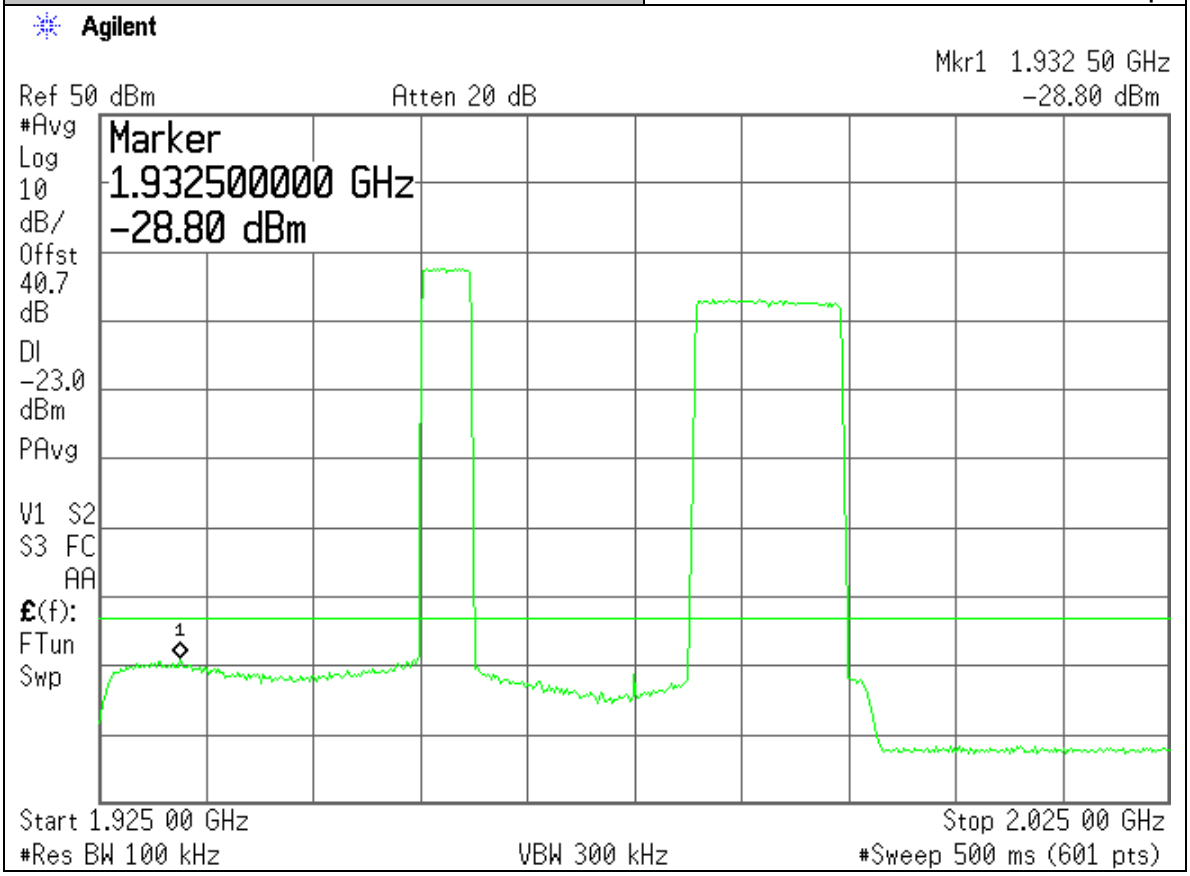
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 5 + 15MHz Carriers, Mid freq



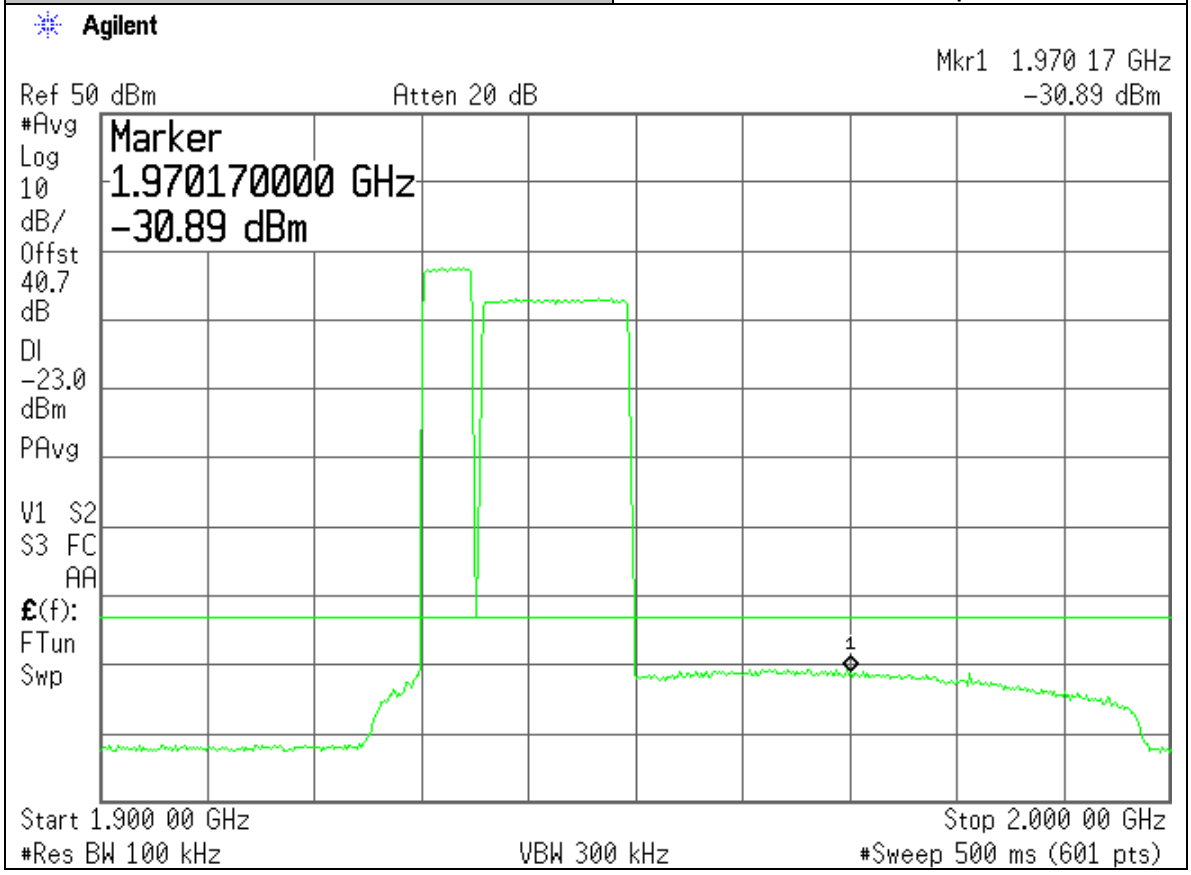
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 5 + 15MHz Carriers, Hi freq



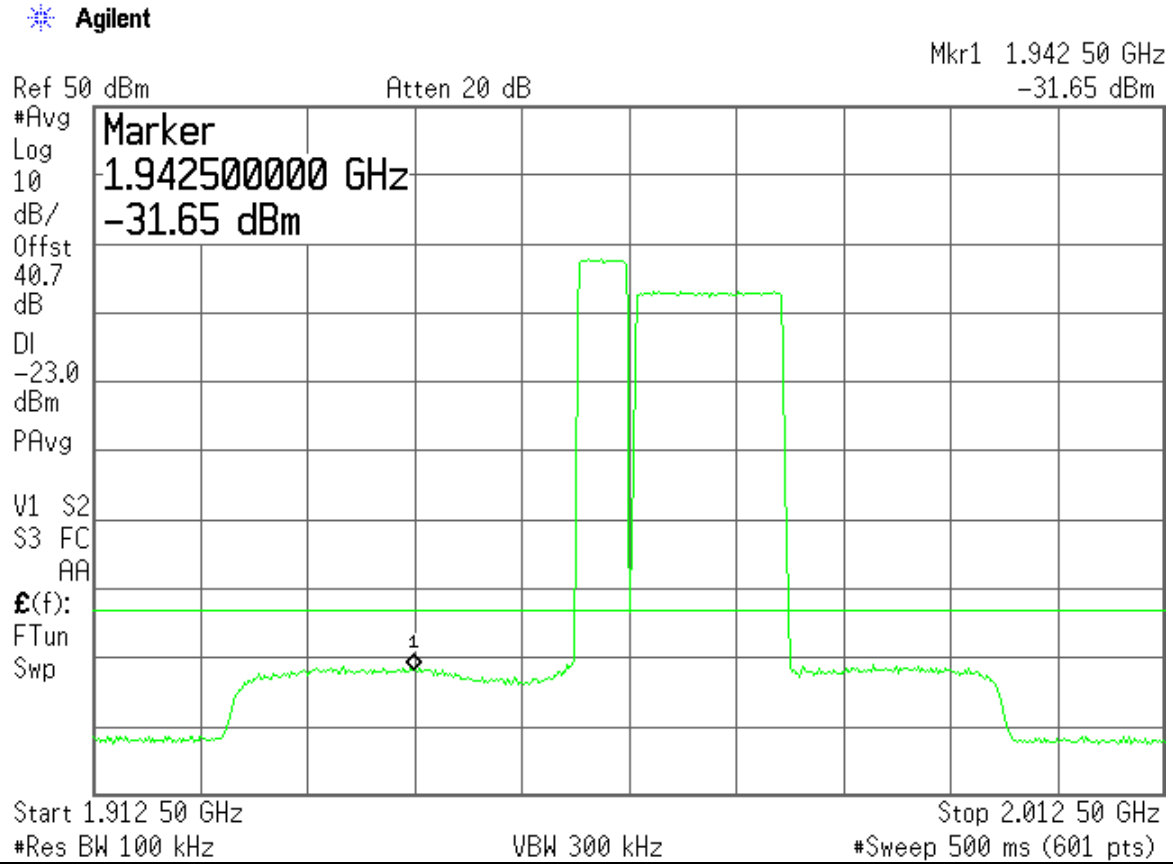
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 5 + 15MHz Adjacent Carriers, Low freq



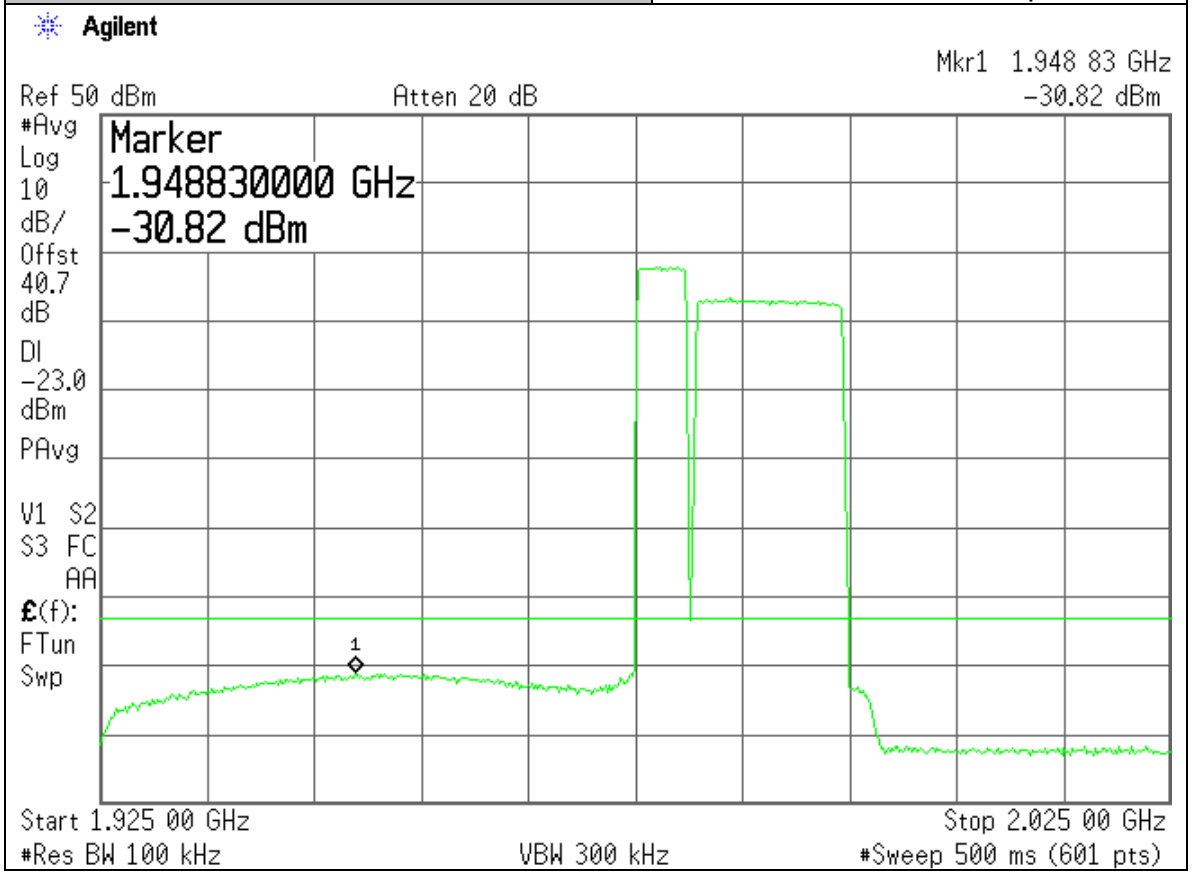
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 5 + 15MHz Adjacent Carriers, Mid freq



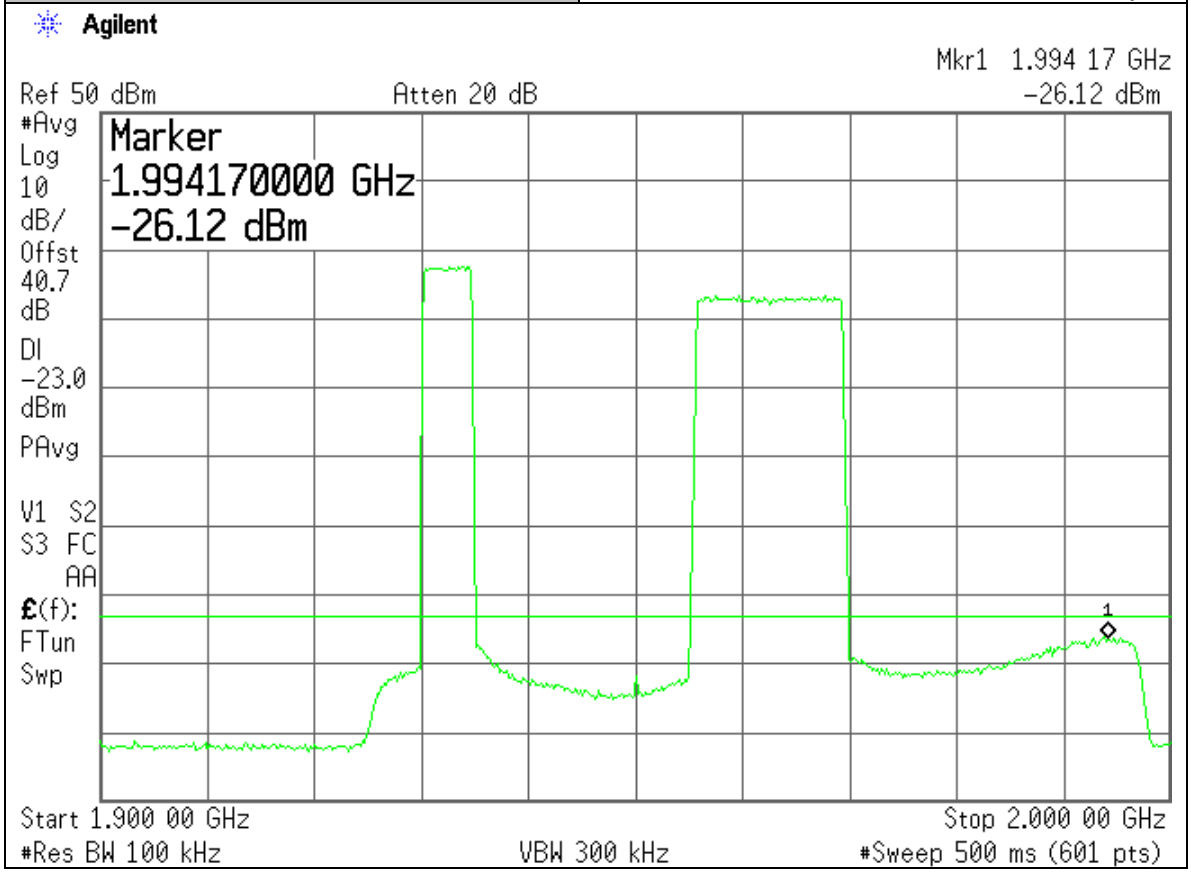
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 5 + 15MHz Adjacent Carriers, Hi freq



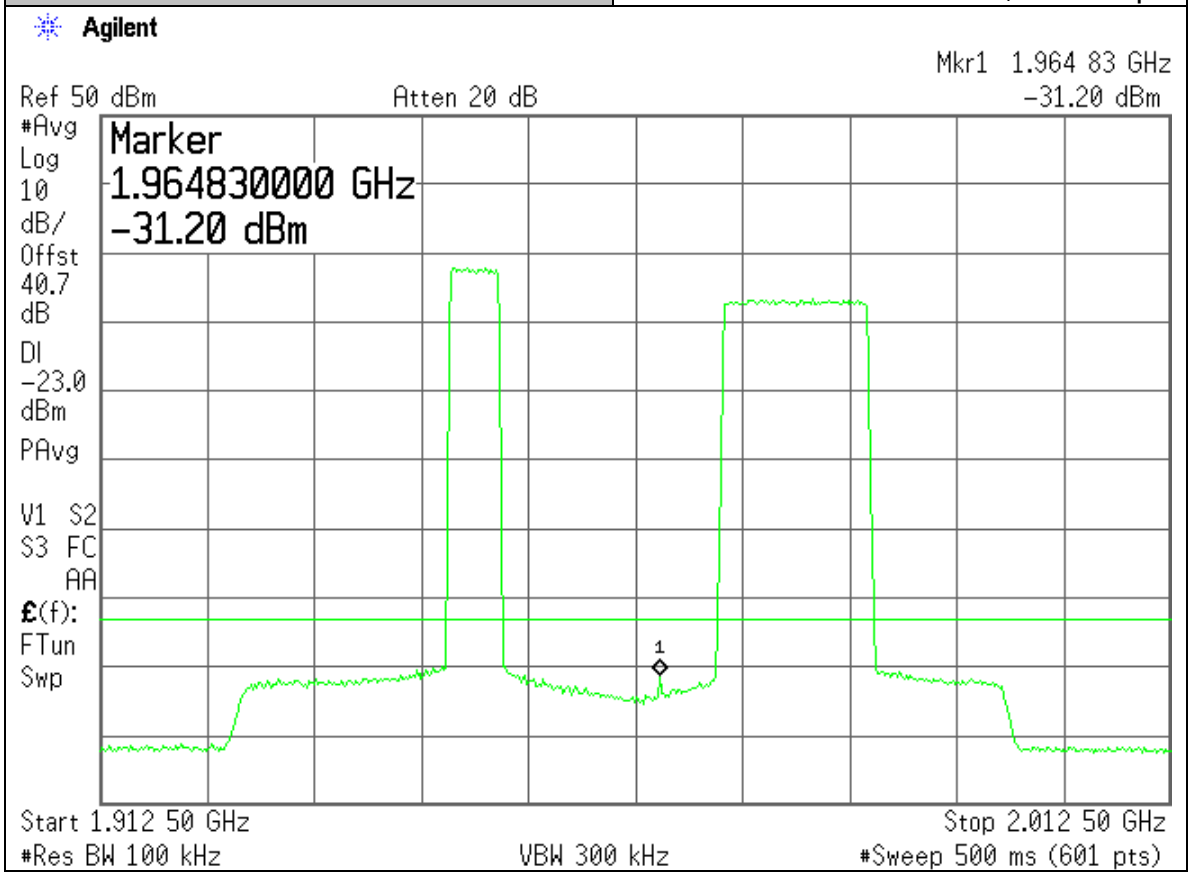
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 5 + 15MHz Carriers, Low freq



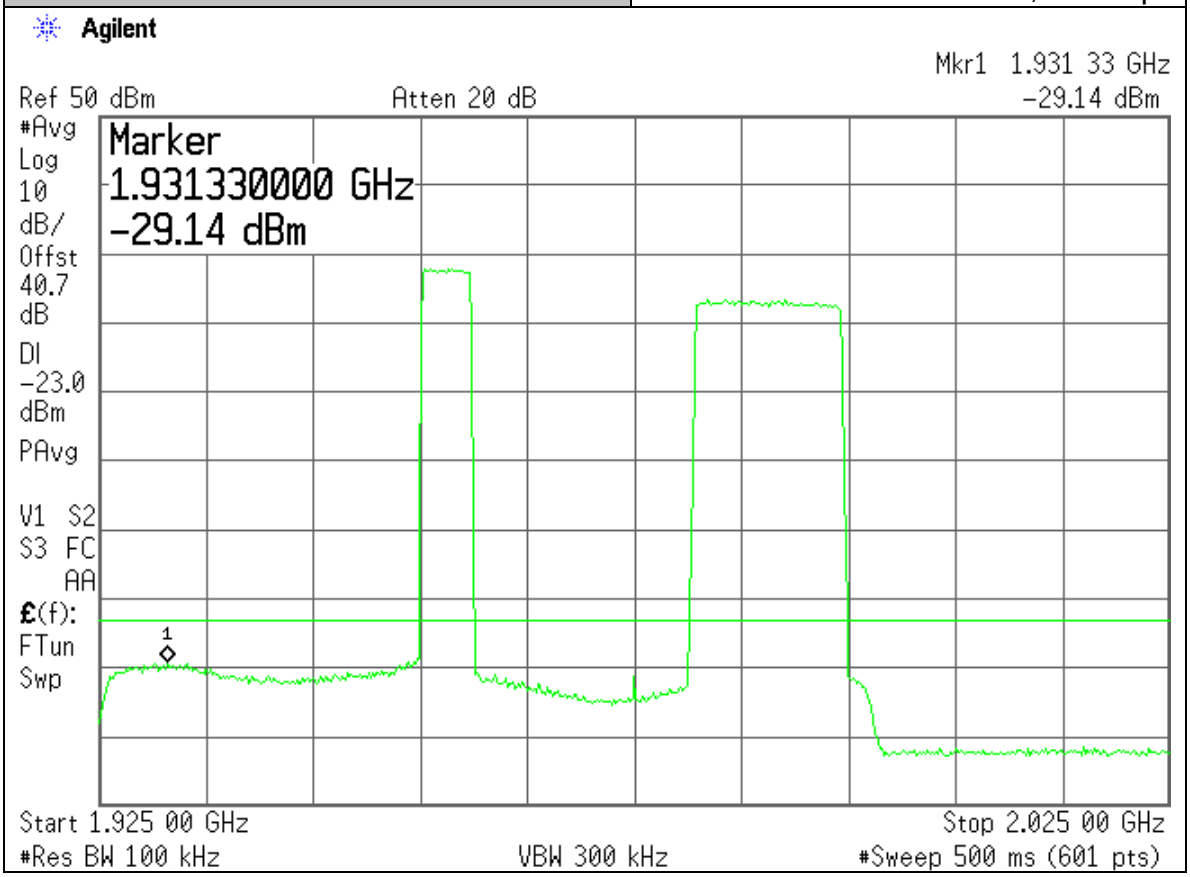
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 5 + 15MHz Carrier, Mid freq



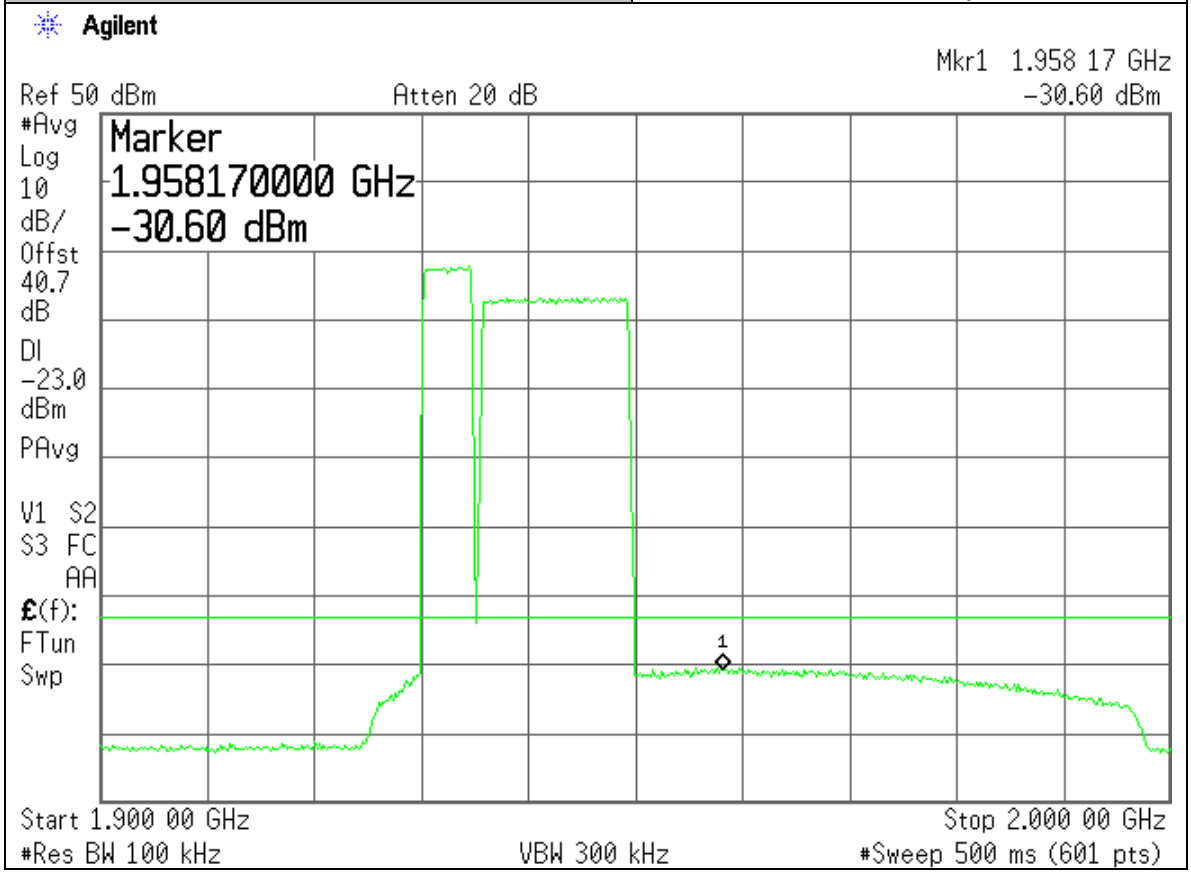
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 5 + 15MHz Carriers, Hi freq



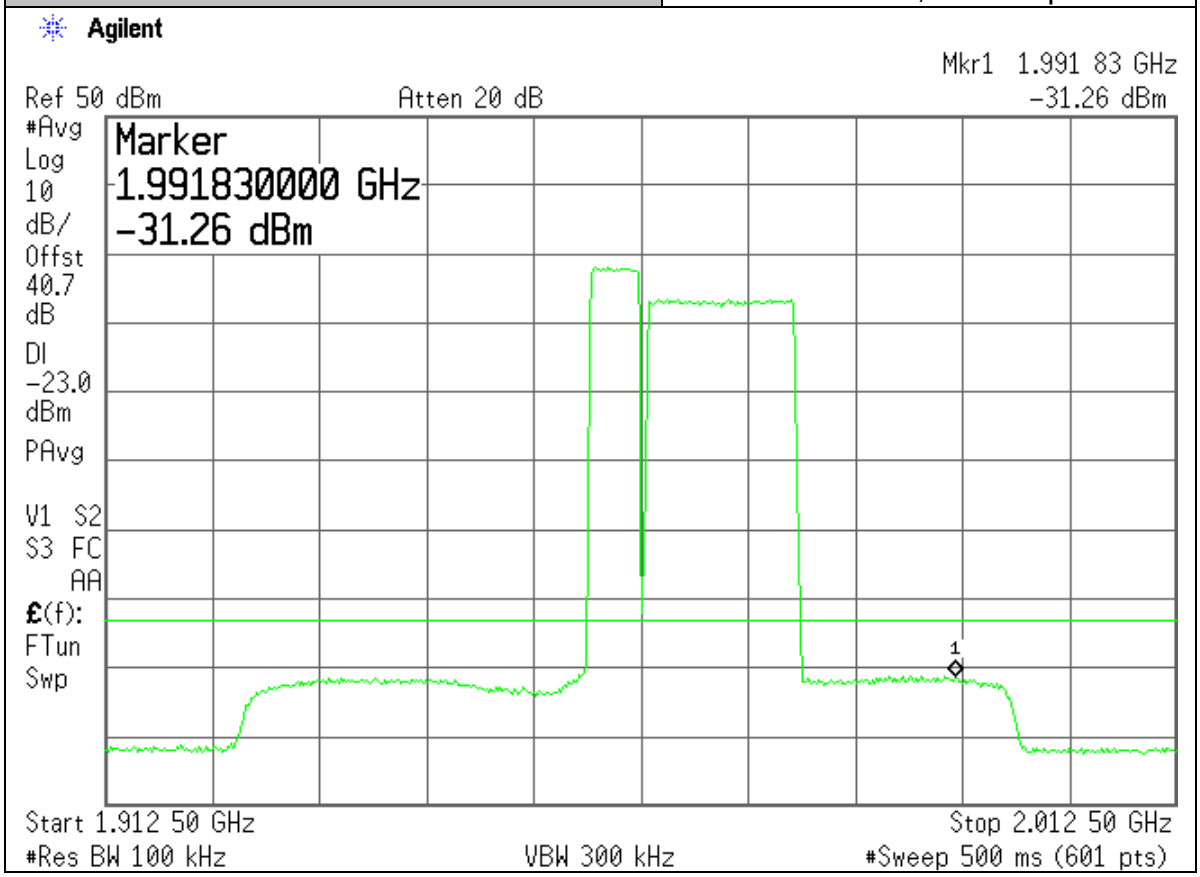
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 5 + 15MHz Adjacent Carriers, Low freq



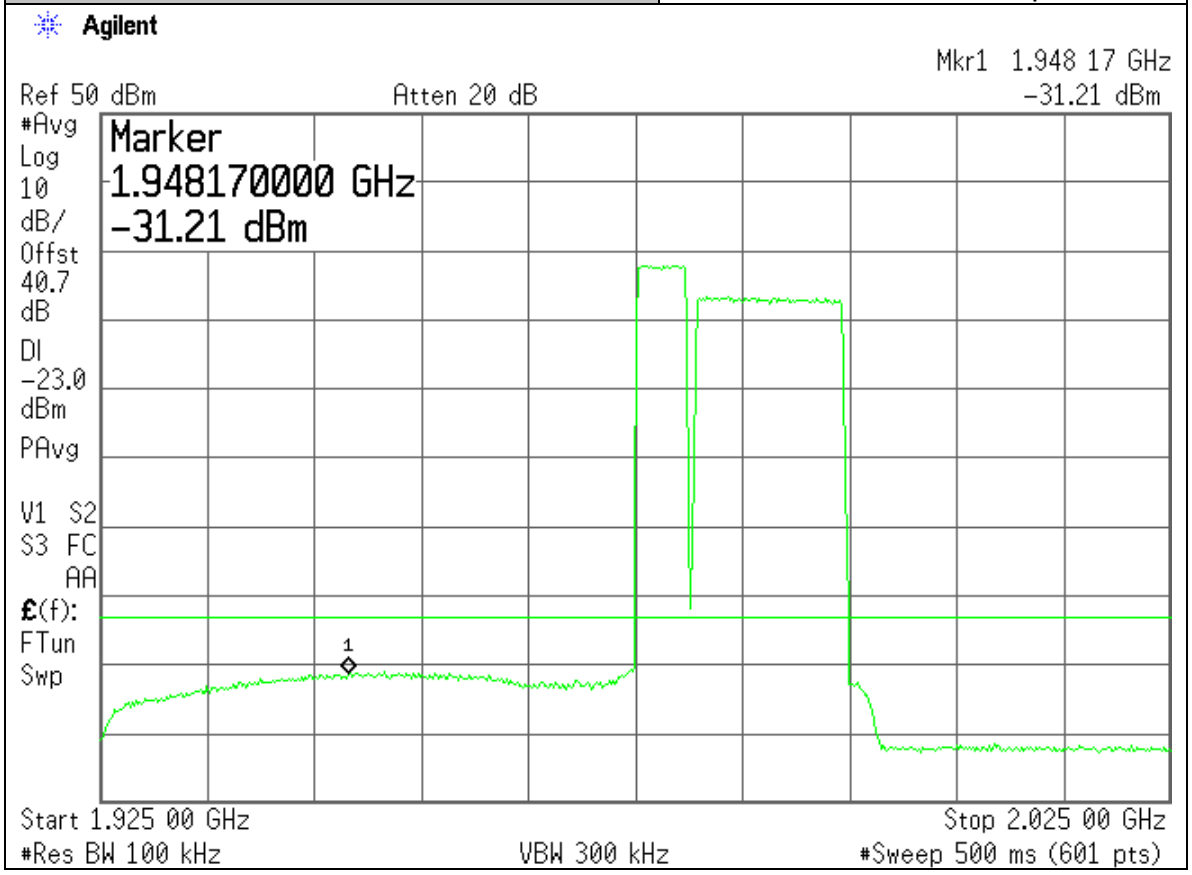
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 5 + 15MHz Adjacent Carriers, Mid freq



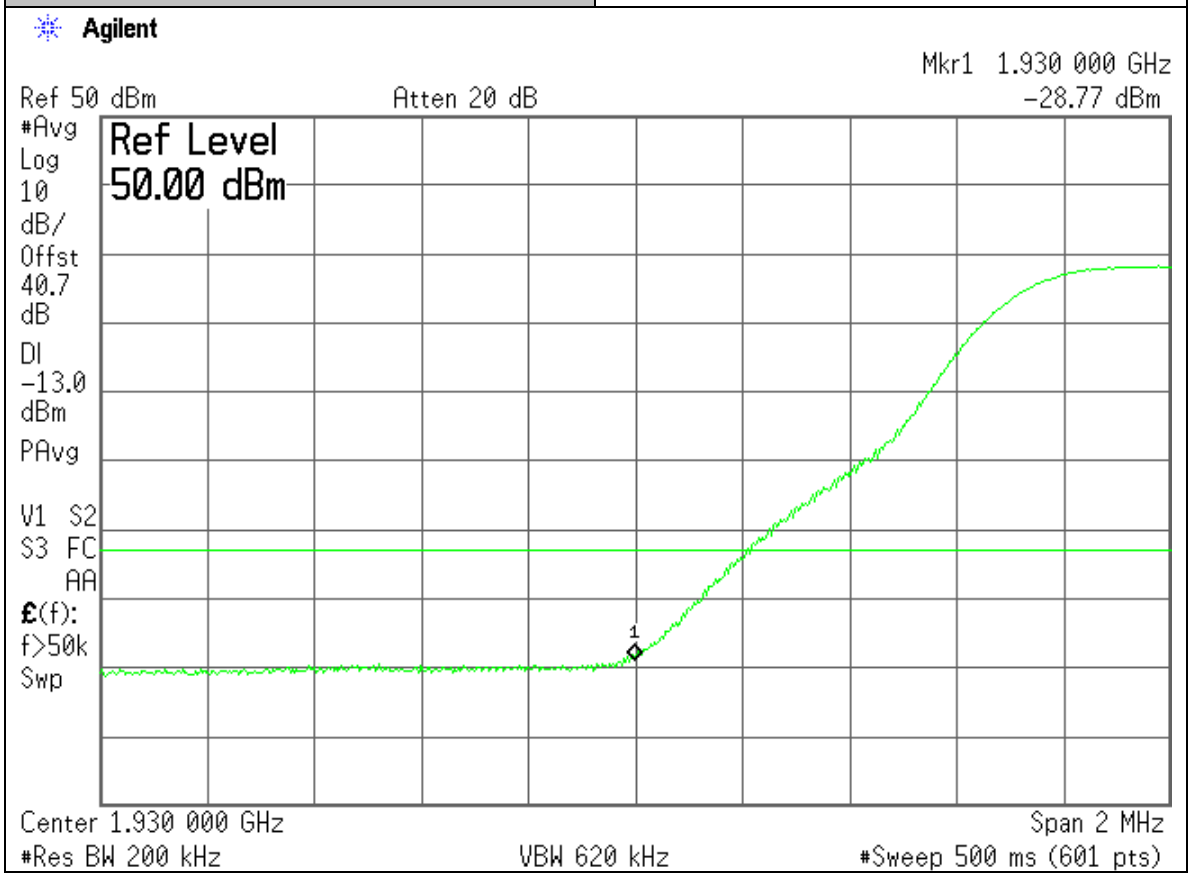
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Inter-modulation
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 5 + 15MHz Adjacent Carriers, Hi freq



Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Low-Chn, Lower Bandedge
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15MHz Carrier

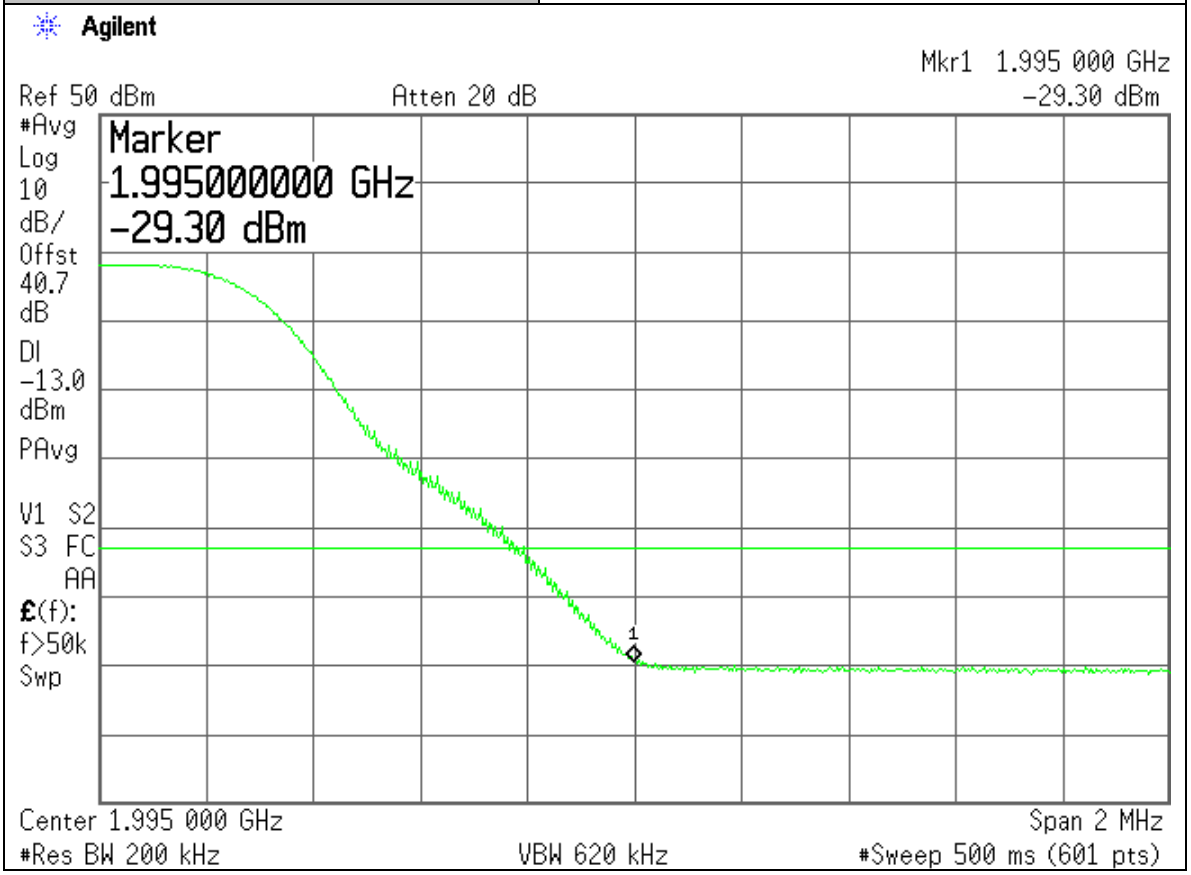


Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Low-Chn, Lower Bandedge
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15MHz Carrier

Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Hi-Chn, Upper Bandedge
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15MHz Carrier

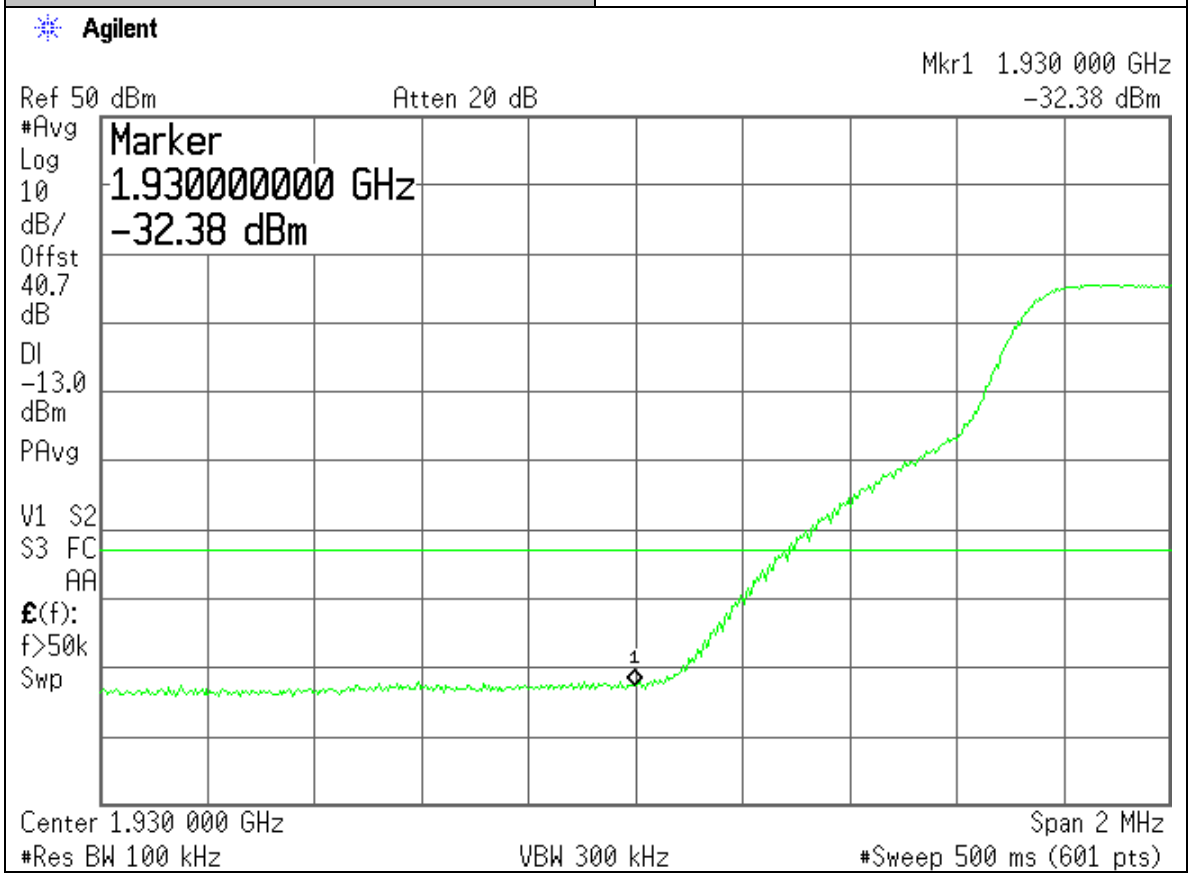


Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Hi-Chn, Upper Bandedge
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15MHz Carrier

Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Low-Chn, Lower Bandedge
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15MHz Carrier

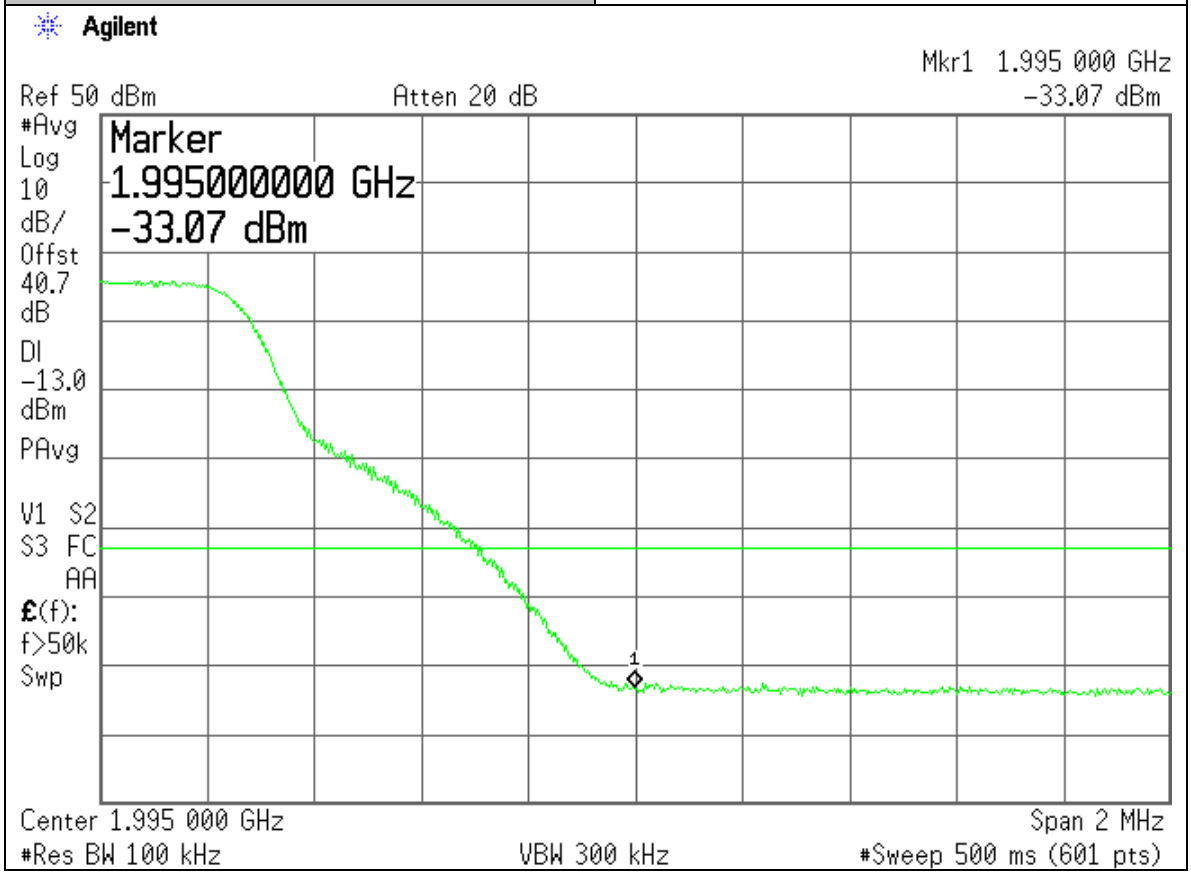


Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Low-Chn, Lower Bandedge
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15MHz Carrier

Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Hi-Chn, Upper Bandedge
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15MHz Carrier

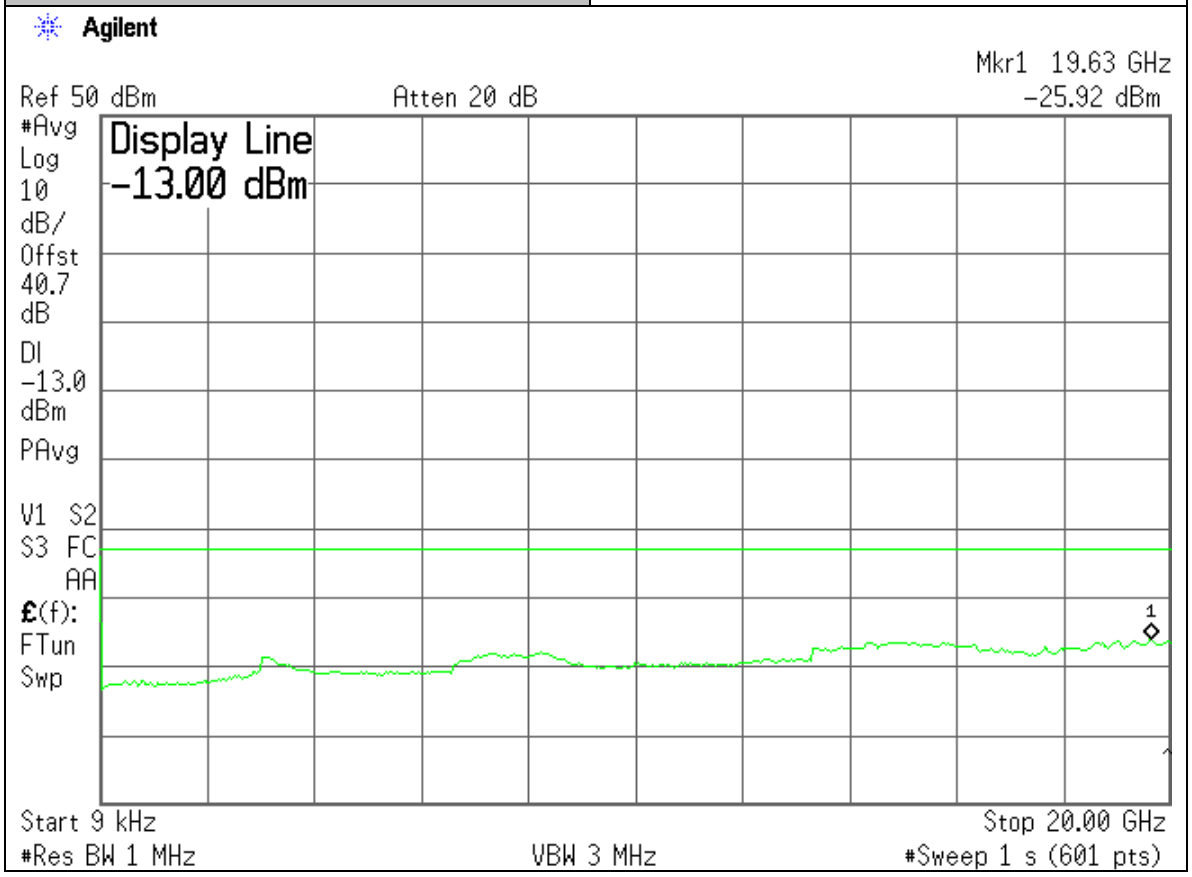


Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Hi-Chn, Upper Bandedge
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15MHz Carrier

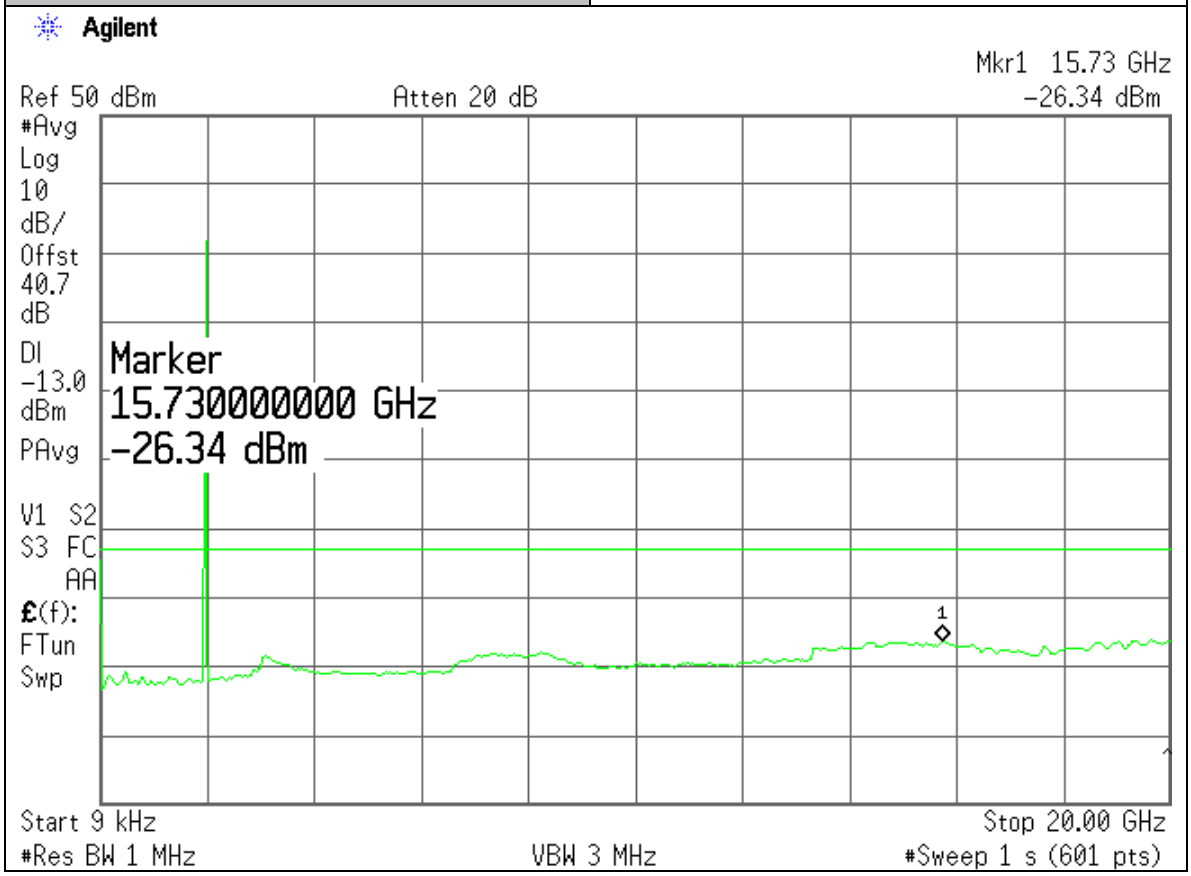
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output Standby Mode: RF Off



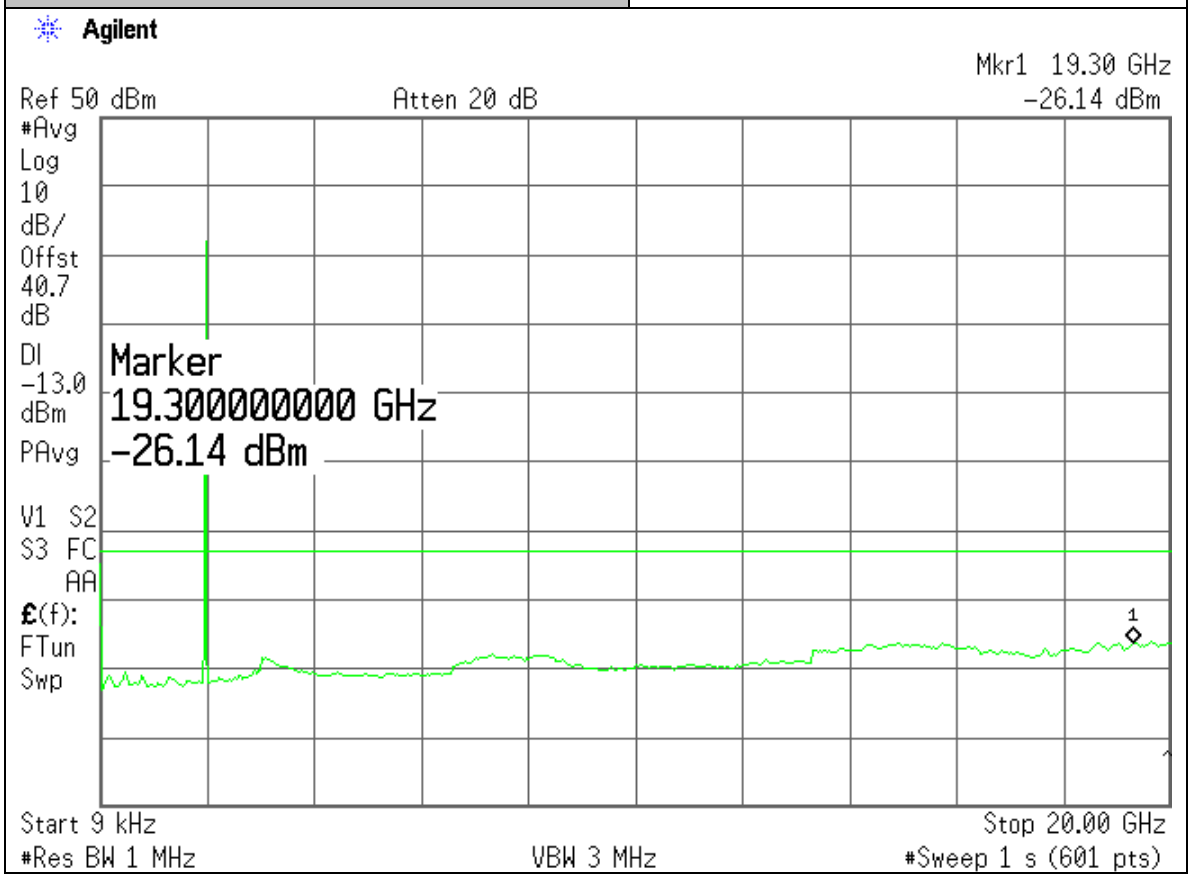
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15MHz Carrier, Low Channel



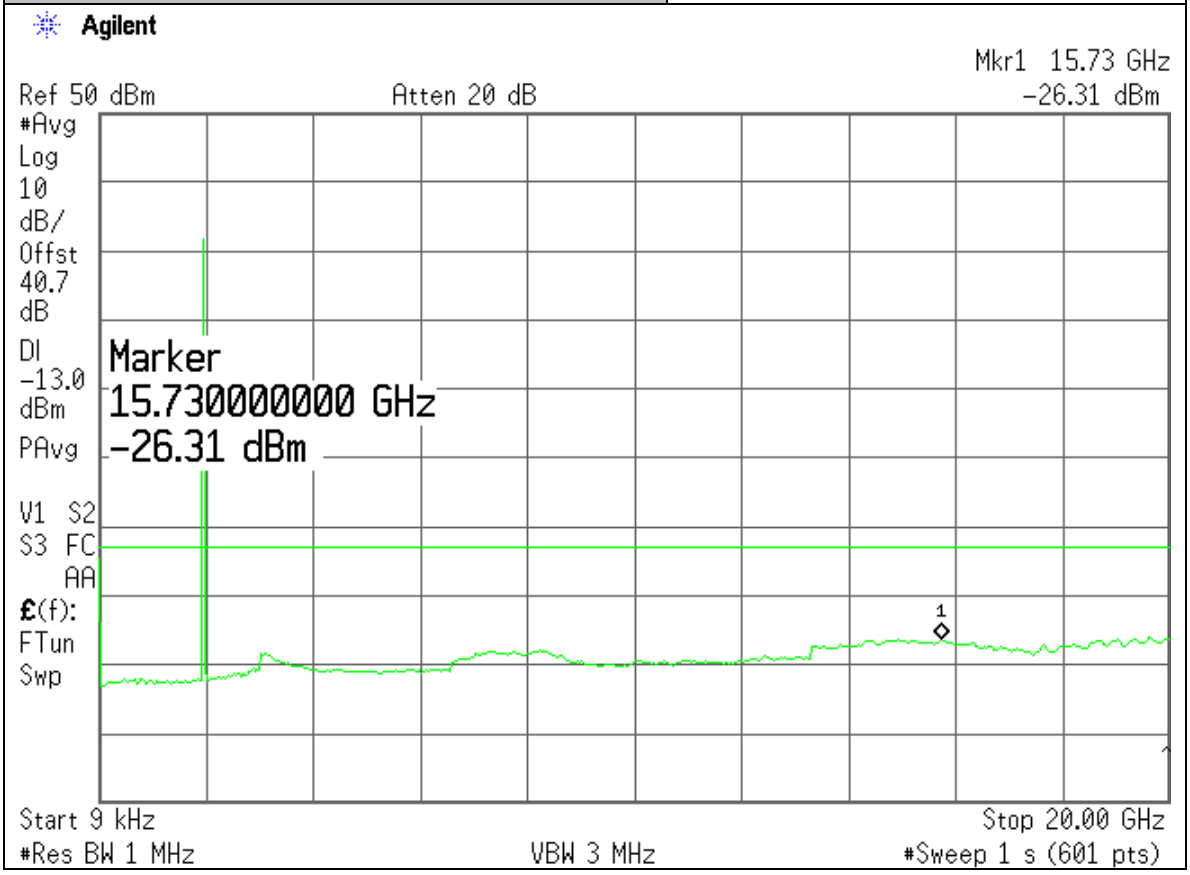
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15MHz Carrier, Mid Channel



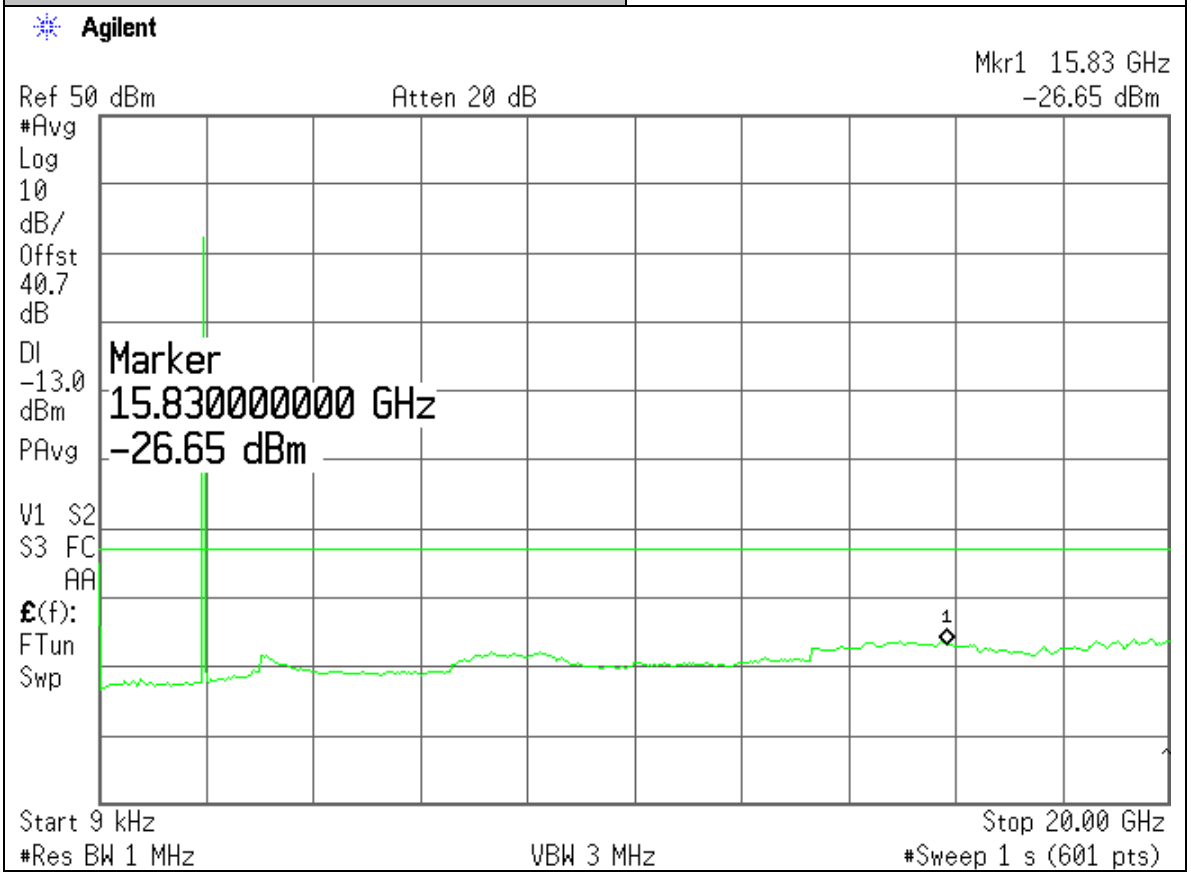
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15MHz Channel, Hi Channel



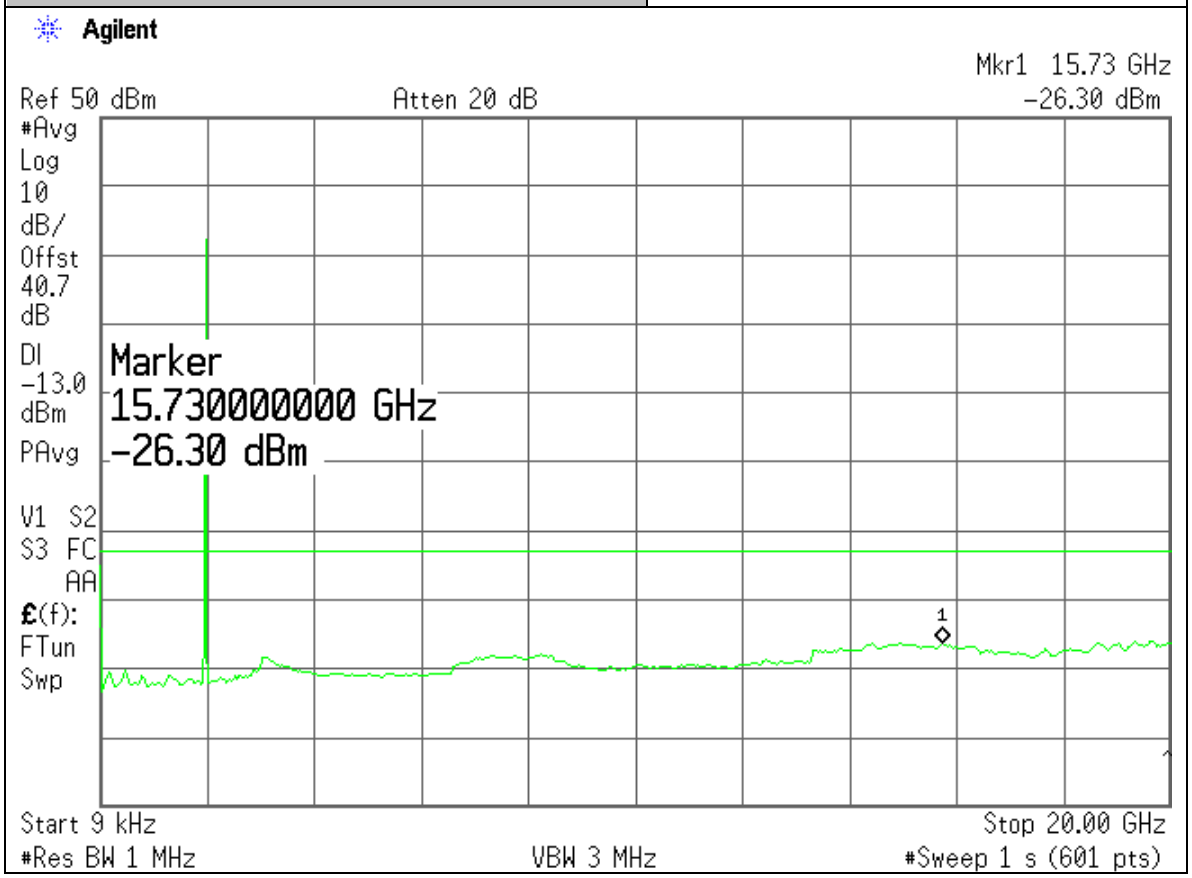
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX2 RF Output TM 11 15MHz Carrier, Low Channel



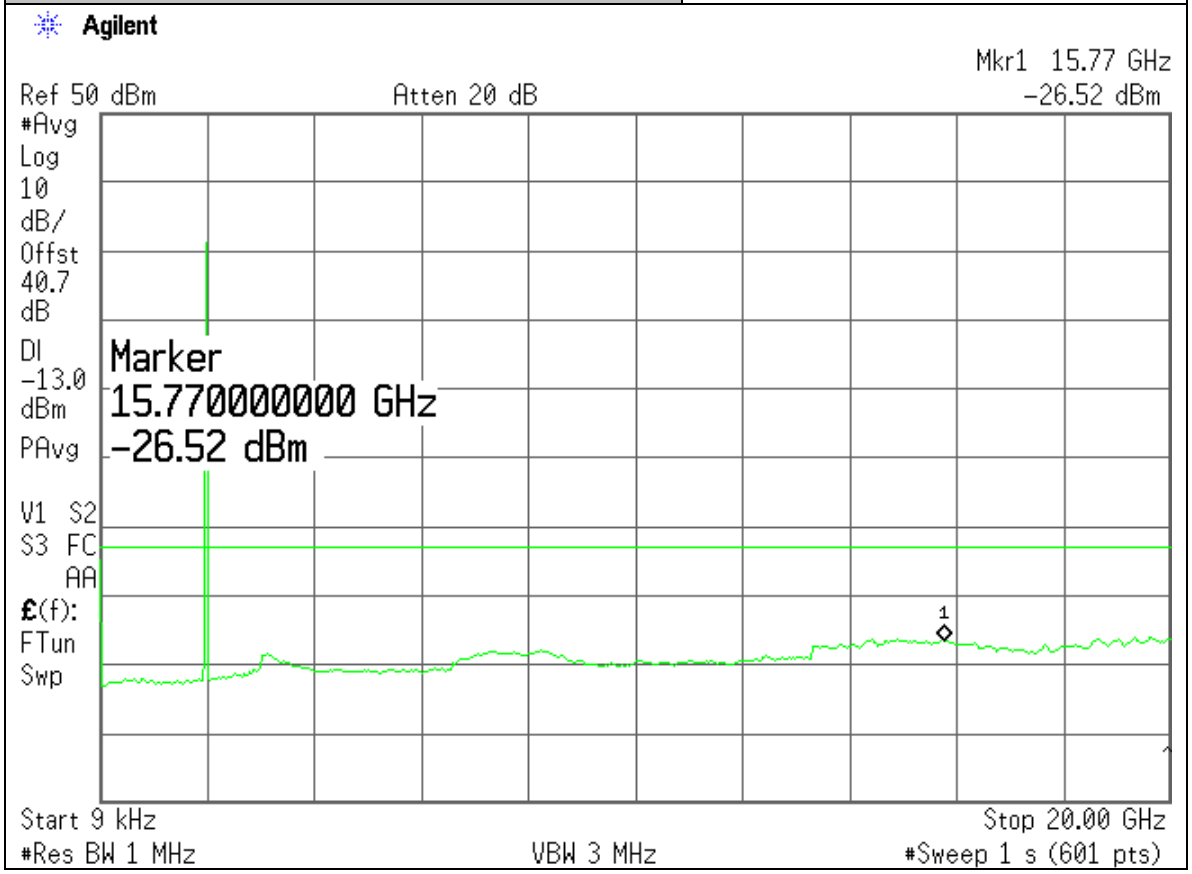
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX2 RF Output TM 11 15MHz Carrier, Mid Channel



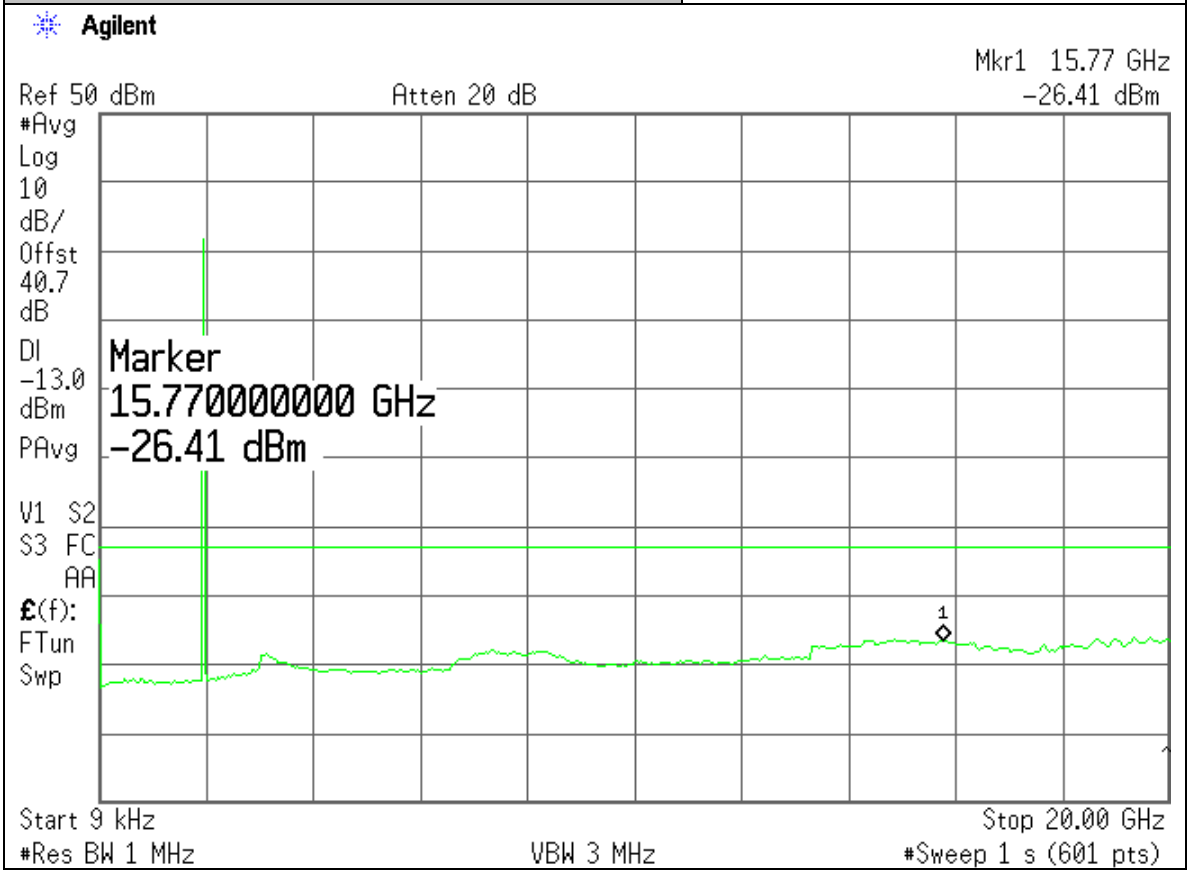
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX2 RF Output TM 11 15MHz Carrier, High Channel



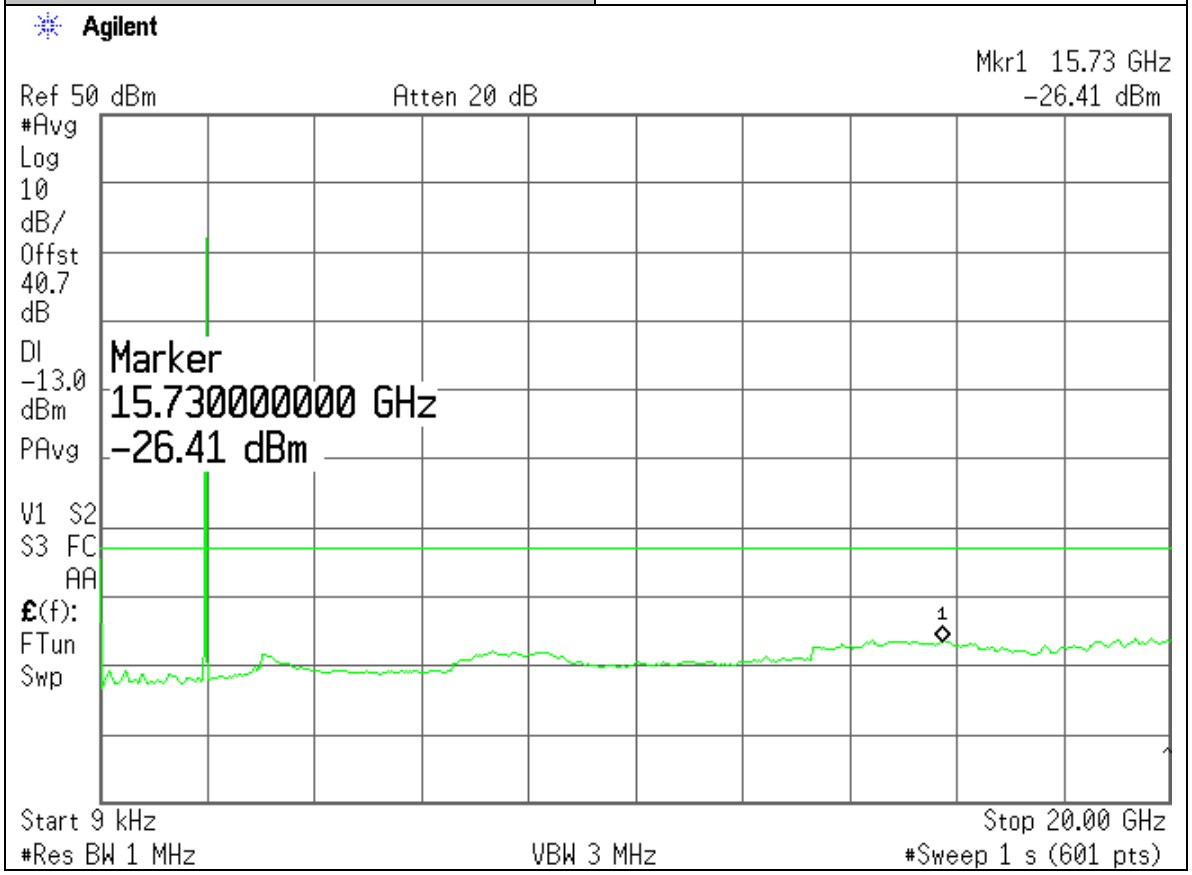
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15MHz Carrier, Low Channel



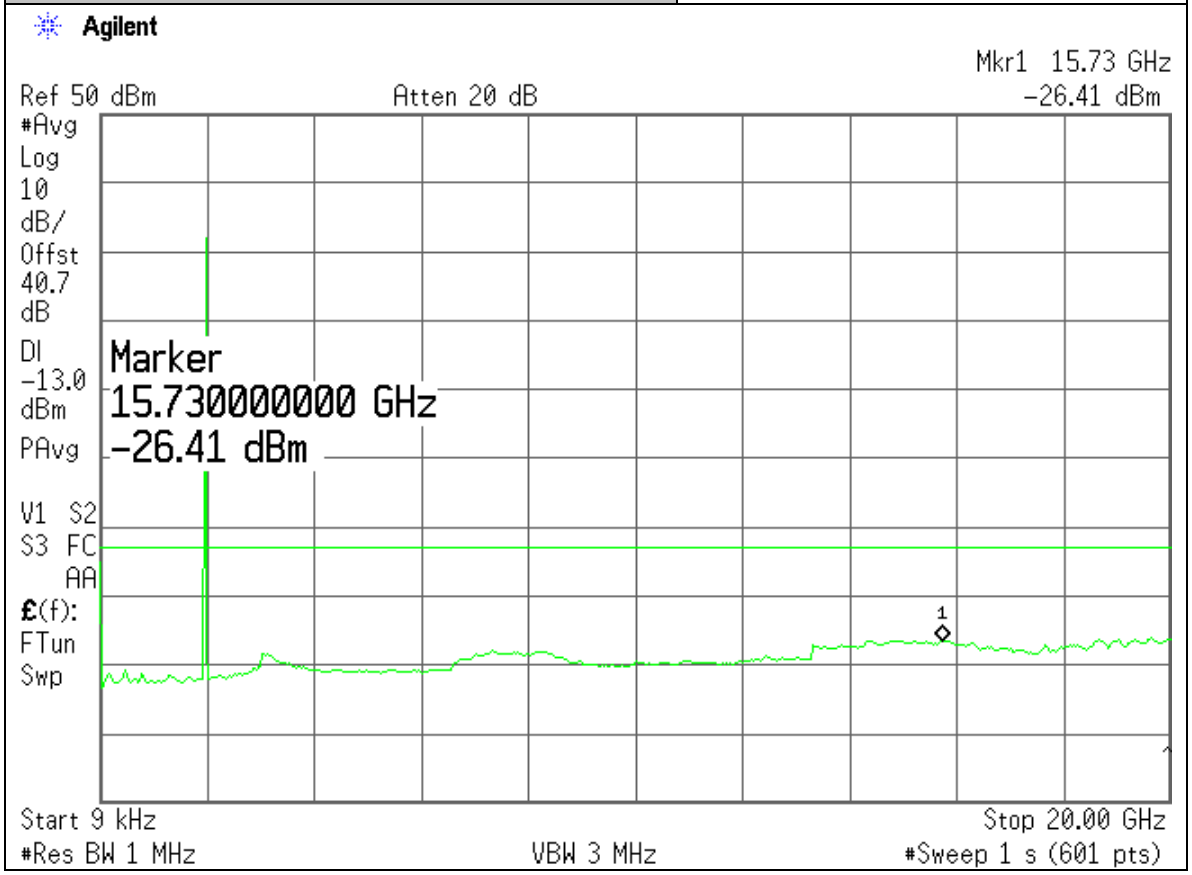
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15MHz Carrier, Mid Channel



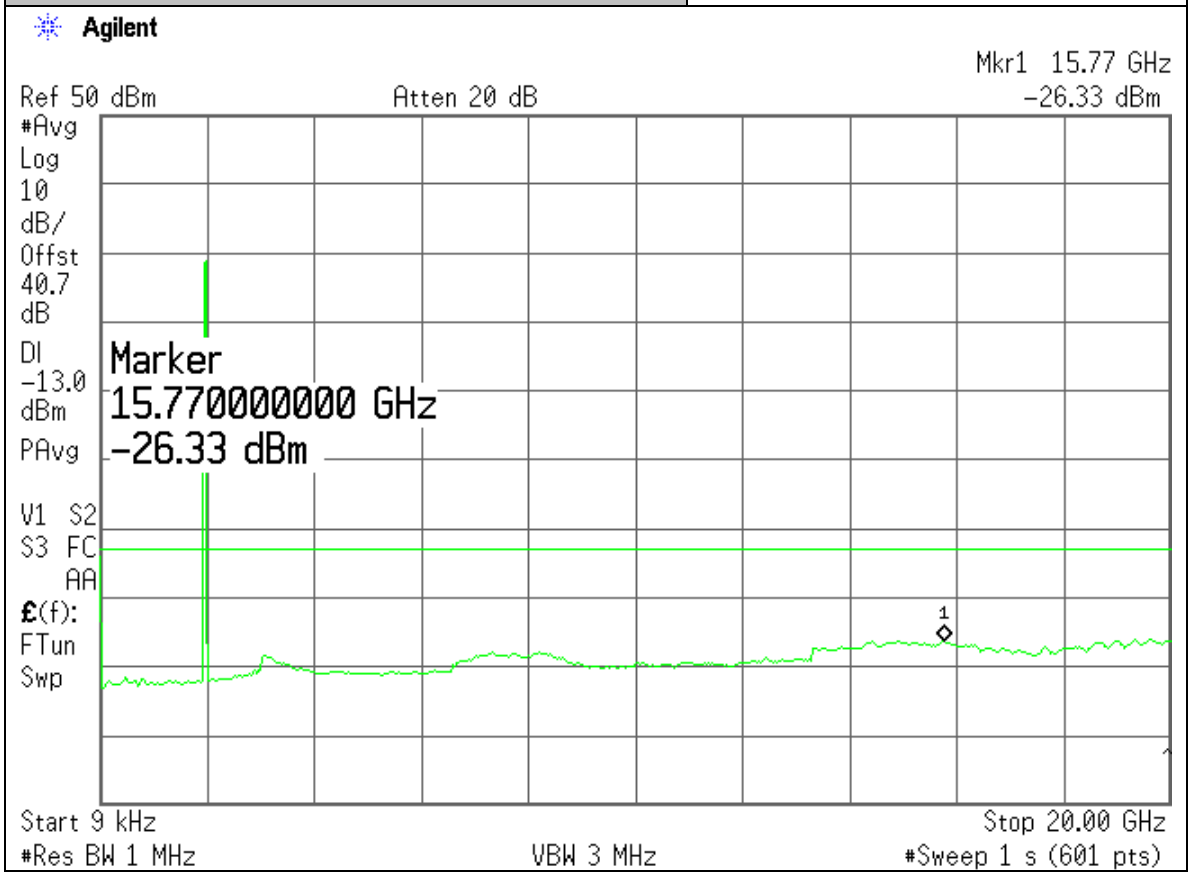
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15MHz Carrier, Hi Channel



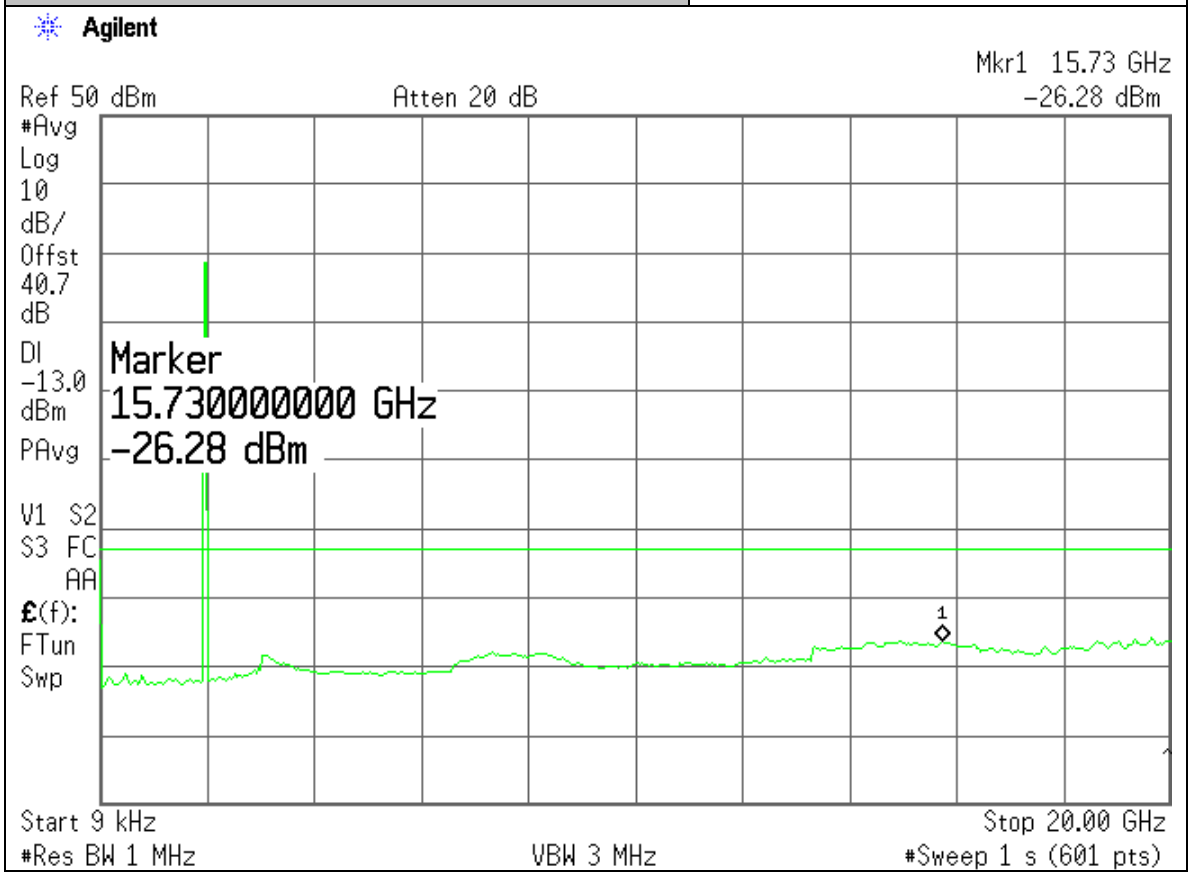
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15 + 5MHz Carriers, Low Channel



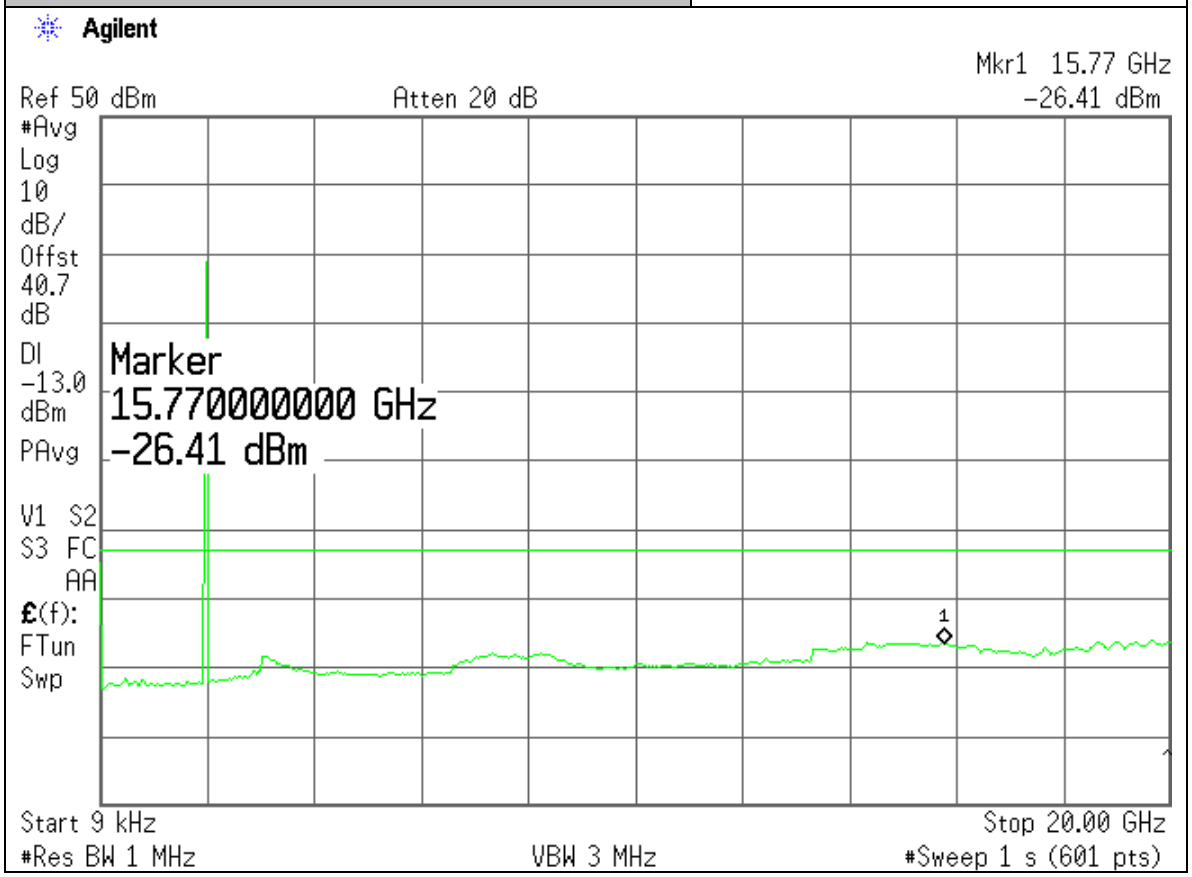
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15 + 5MHz Carriers, Mid Channel



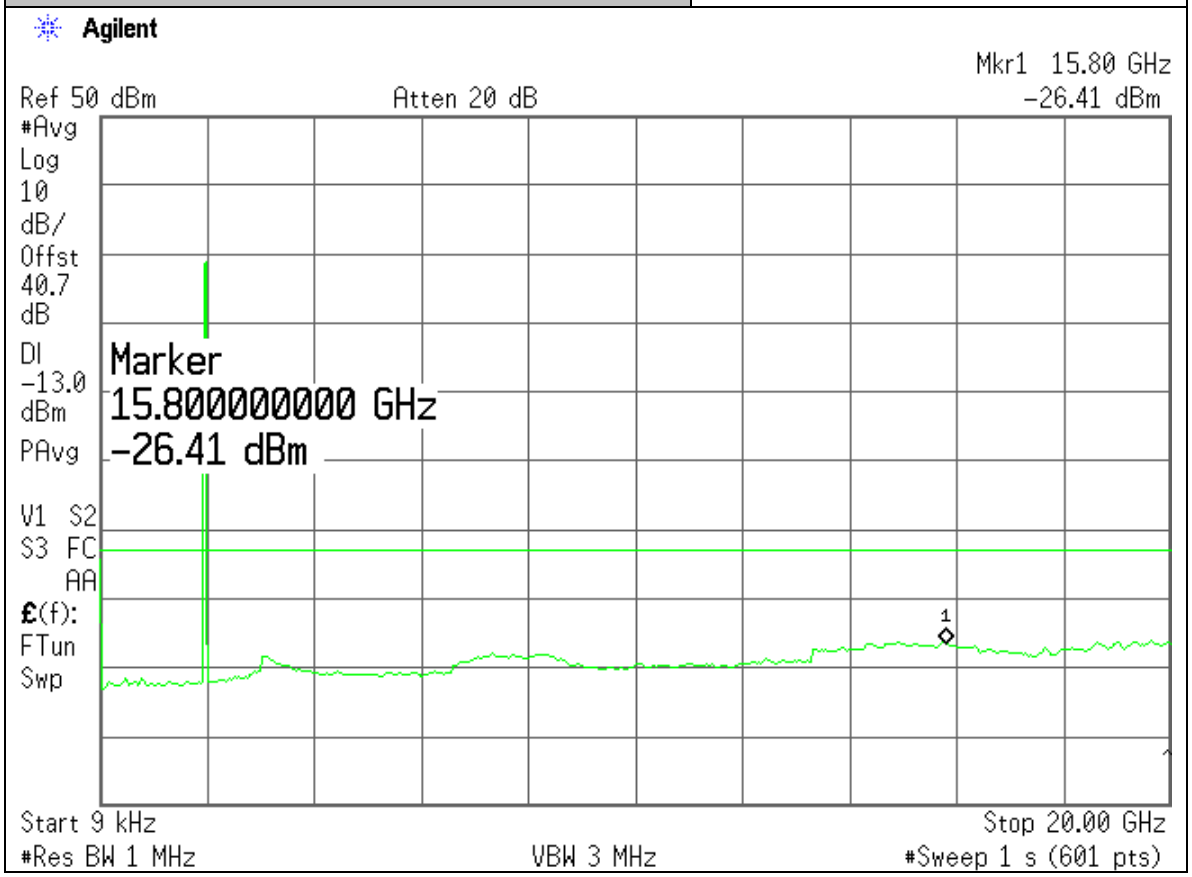
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 15 + 5MHz Carriers, High Channel



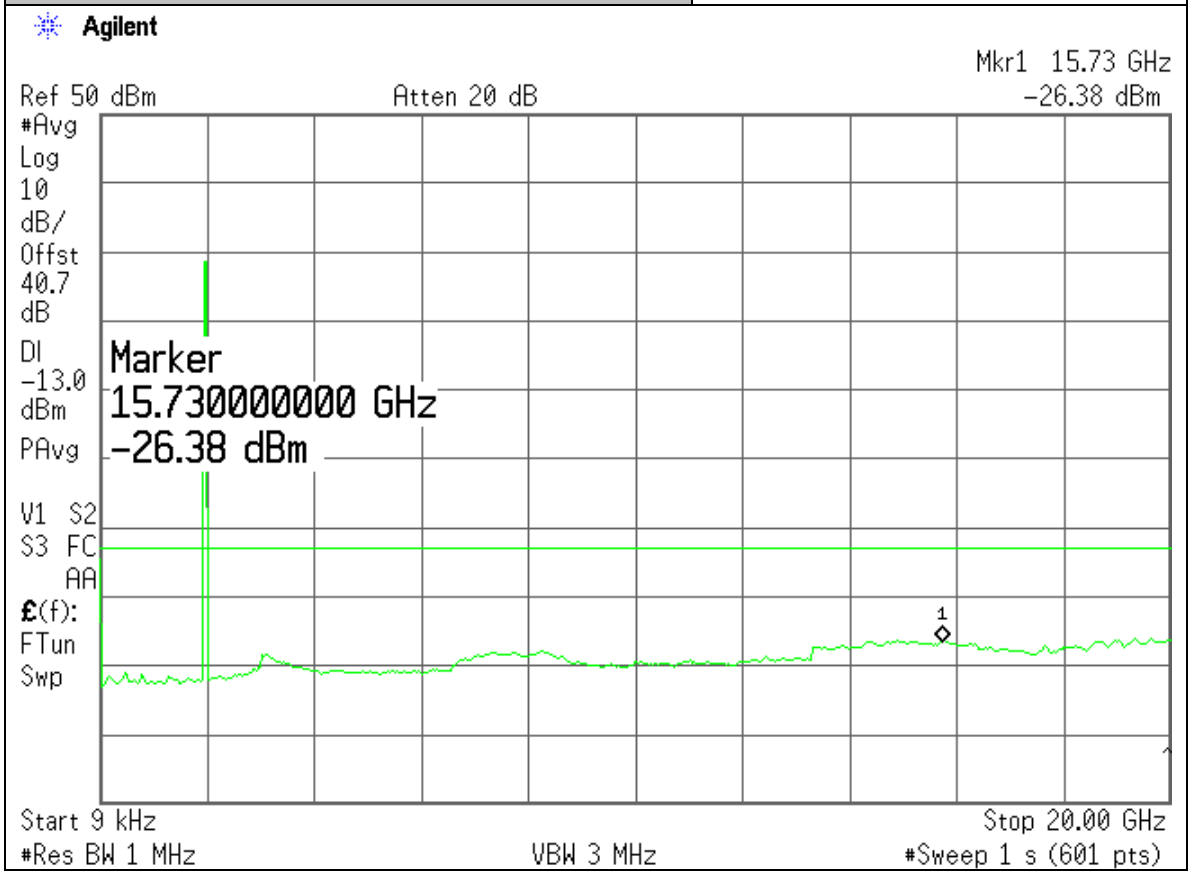
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15 + 5MHz Carriers, Low Channel



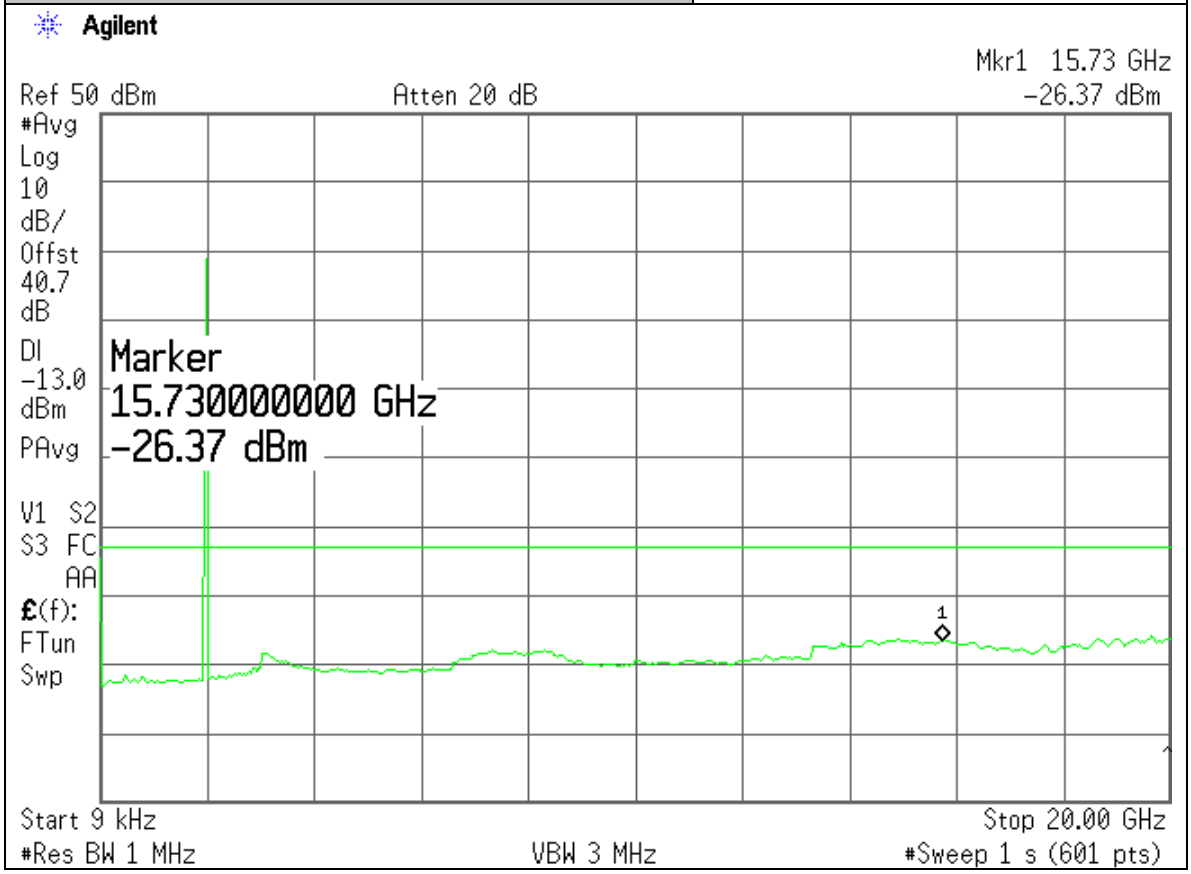
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15 + 5MHz Carriers, Mid Channel



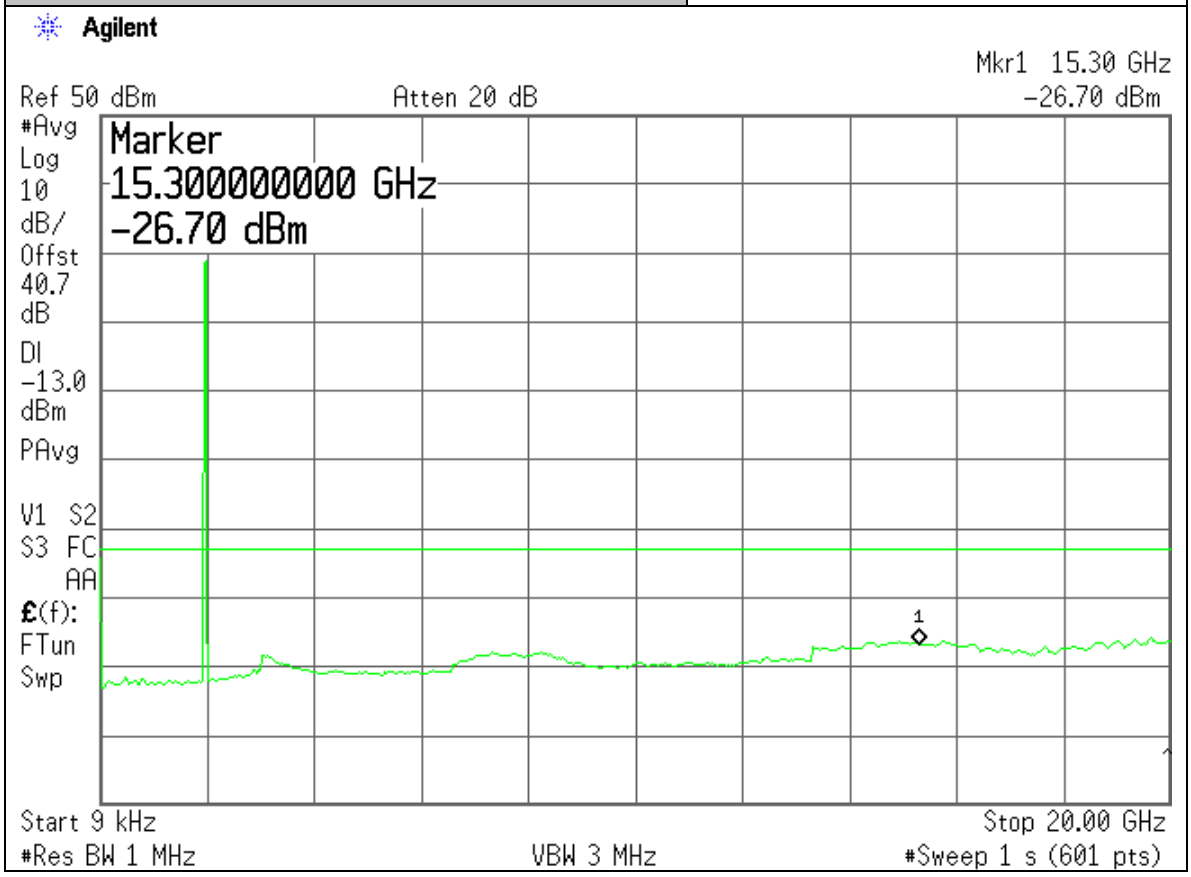
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 15 + 5MHz Carriers, High Channel



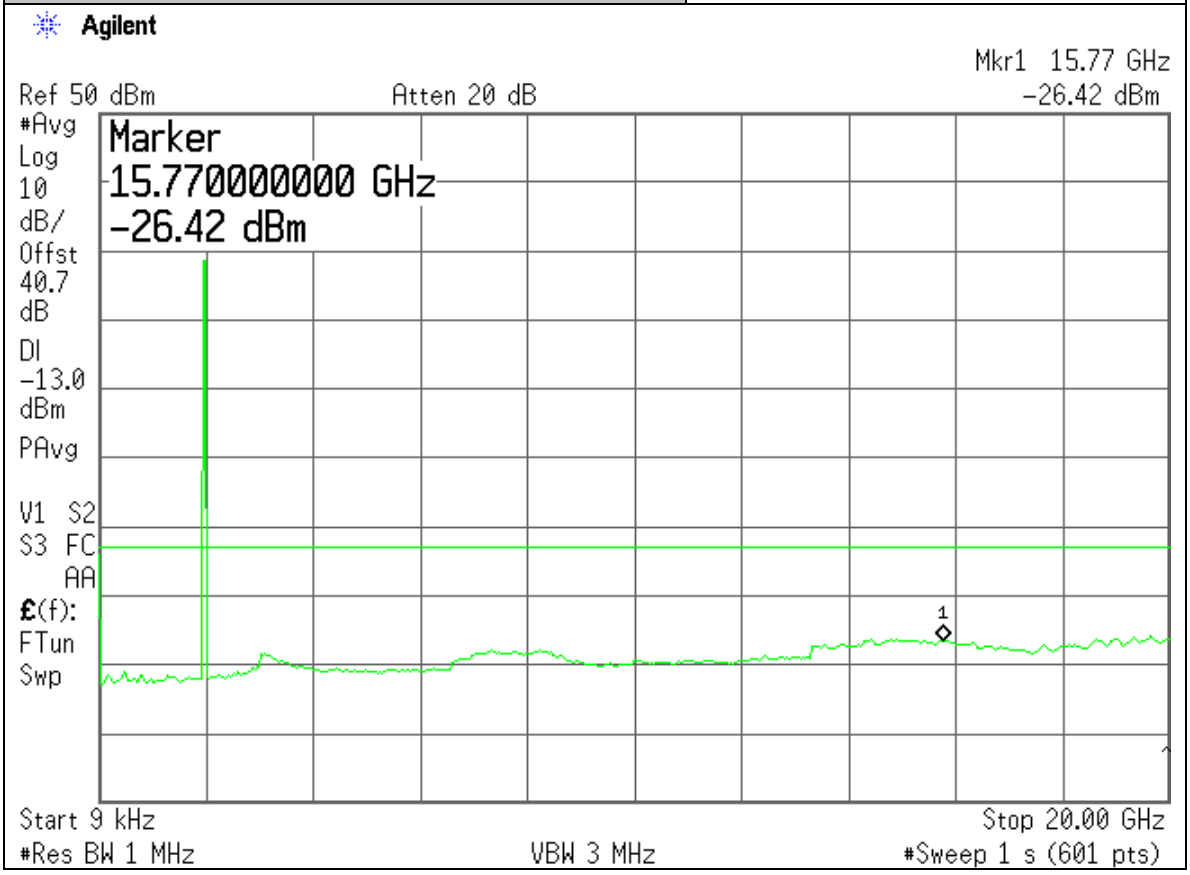
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 5 + 15MHz Carriers, Low Channel



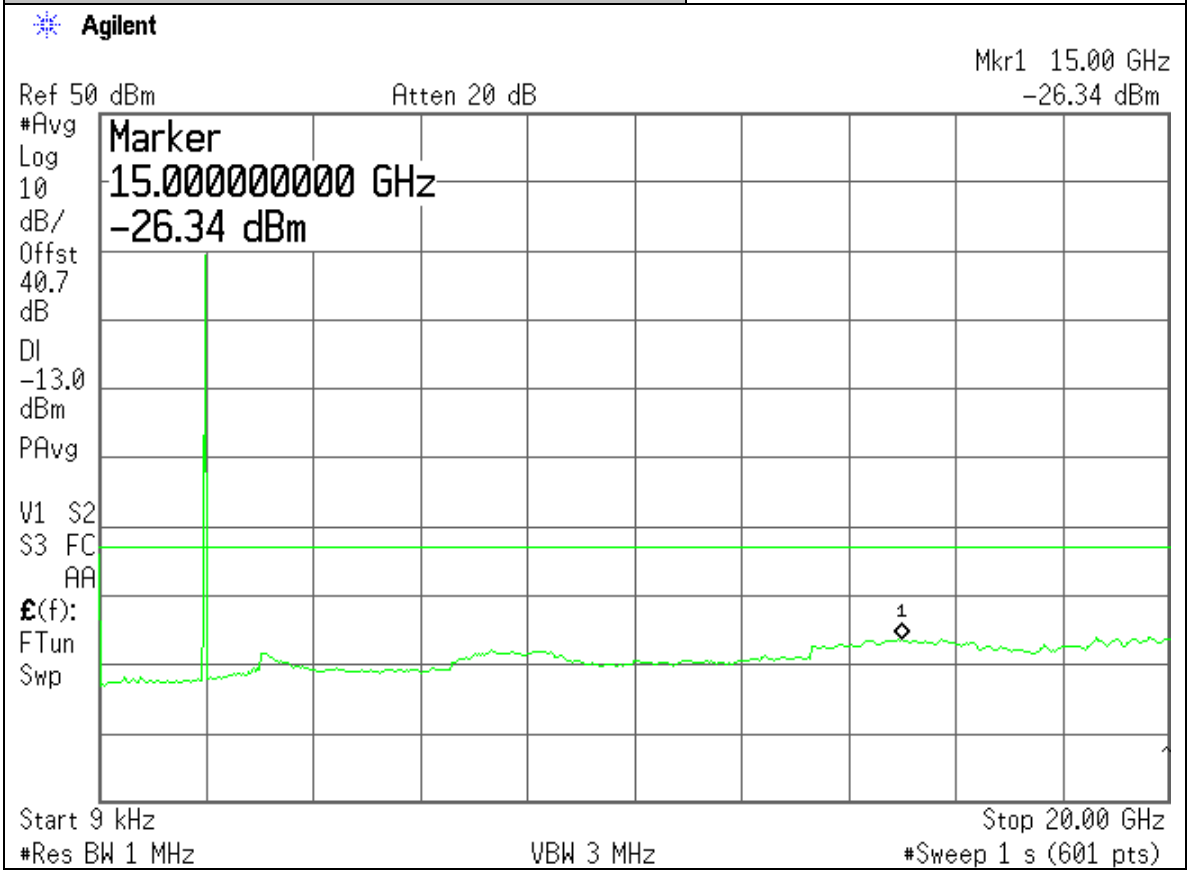
Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 5 + 15MHz Carriers, Mid Channel



Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 11 5 + 15MHz Carriers, High Channel



Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

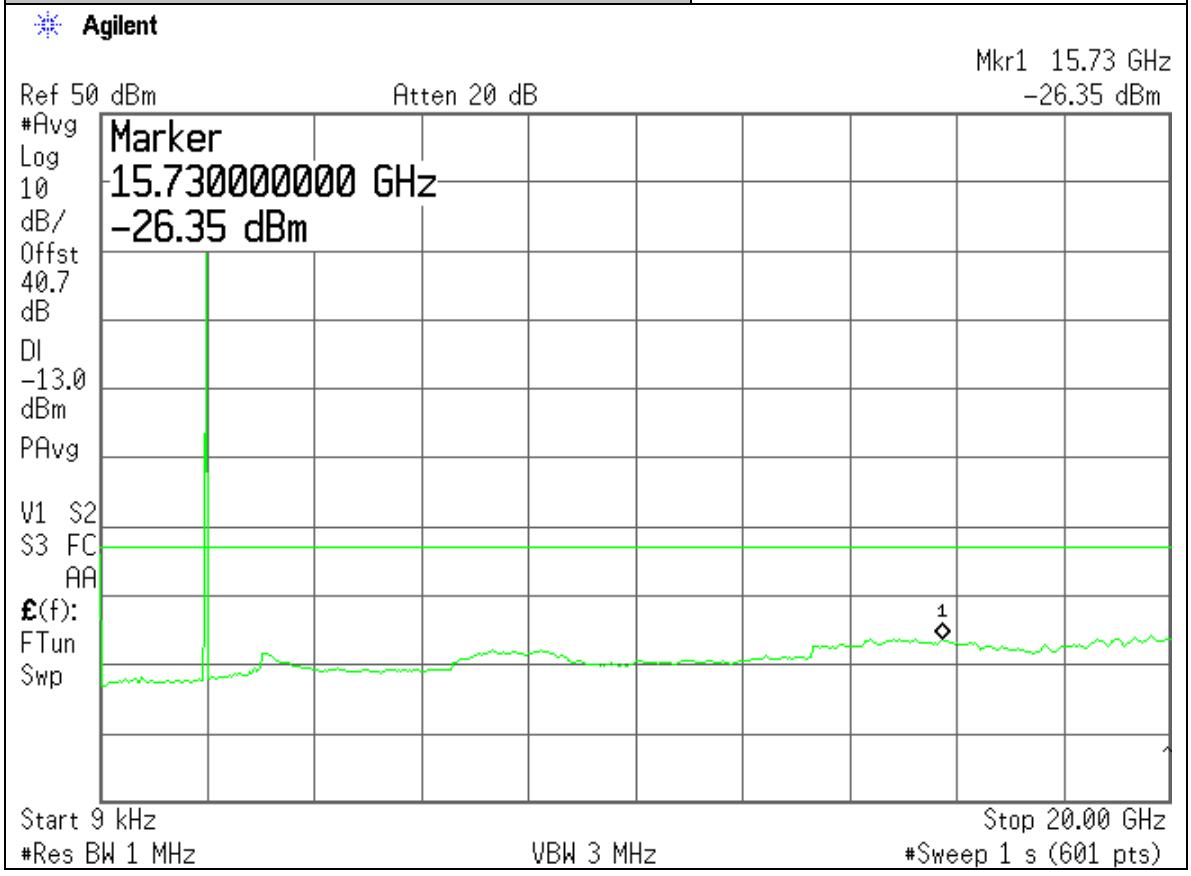
Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 5 + 15MHz Carriers, Low Channel

Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 5 + 15MHz Carriers, Mid Channel

Project Number:	0048-141020-01
EUT:	AA190045
PARTS NO.:	RF151032
Tested By:	Wei Li
Temperature:	70°F
Humidity:	30%

Section:	Spurious Emissions at RF Output Port:
Plot Name:	Downlink, Worst Case 9kHz to 20GHz
Configuration:	Input: Digital; Output: TX1 RF Output TM 31 5 + 15MHz Carriers, High Channel



Section 6. Field Strength of Spurious

Name of Test:	*Field Strength of Spurious*	Test Standard:	*22.917 24.238*
Tested By:	WEI LI	Test Date:	06/17/2013-06/25/2013

Minimum Standard: Para. No. 24.238(a). The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall not less than 43+10 log (mean output power in watts) dBc below the mean power output outside a licensee's frequency block (-13dBm).

Method of Measurement: TIA/EIA-603, Section 2.2.12
The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The spurious emissions were measured at a distance of 3 meters. The EUT was then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna was fed with a signal at the spurious frequency. The level of the signal was adjusted to repeat the previously measured level. The resulting ERP is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

Per FCC KDB 971168 v02r2, Measurement Guidance for Certification of Licensed Digital Transmitters, the approach using Mathematical Conversions in Sec. 5.8.3 can be used in this case.

*Base on pre-testing results for different operation modes shown on page 7, the data for the worst case, 15MHz BW/QPSK/1 Carrier, configuration, was recorded as final result.

Test Result: **Complies**

Test Data: See Attached Table(s)

Configuration	LTE w/ Rated Output Power. Port 1 and 2 Terminated with 50 Ohm Load.
Band	Broadband PCS Downlink
Channel	Low

Freq. (MHz)	H,V	SA Reading (dBuV)	Height (m)	Angle (degree)	EIRP =E-95.3 @ 3m (dBm)**		Absolute Limit (dBm)	Margin (dB)
3864	H	40.1	1.1	020	-55.2		-13	-42.2
5796.5	H	41.5	1.2	055	-53.8		-13	-40.8
7729	H	42.7	1.2	010	-52.6		-13	-39.6
3864	V	41.5	1.1	170	-53.8		-13	-40.8
5796.5	V	42.7	1.1	255	-52.6		-13	-39.6
7729	V	42.6	1.1	245	-52.7		-13	-39.7

NOTE:
*** Measured noise floor**
SA: Spectrum Analyzer
EUT's Signal.: 15MHz BW/QPSK /1 Carrier as worst case

H=horizontal and V=vertical
** Per FCC KDB 971168 D01 Power Measurement License Digital Systems V02r2. Sec. 5.8.3 with D=3m.

Configuration	LTE w/ Rated Output Power. Port 1 and 2 Terminated with 50 Ohm Load.
Band	Broadband PCS Downlink
Channel	Middle

Freq. (MHz)	H,V	SA Reading (dBuV)	Height (m)	Angle (degree)	EIRP =E-95.3 @ 3m (dBm)**		Absolute Limit (dBm)	Margin (dB)
3925	H	40.5	1.1	035	-54.8		-13	-41.8
5887.5	H	41.9	1.2	025	-53.4		-13	-40.4
7850	H	42.3	1.1	350	-53		-13	-40
3925	V	41.7	1.0	170	-53.6		-13	-40.6
5887.5	V	42.9	1.1	200	-52.4		-13	-39.4
7850	V	42.4	1.1	180	-52.9		-13	-39.9

NOTE:

*** Measured noise floor**
SA: Spectrum Analyzer
EUT's Signal.:15MHz BW/QPSK /1 Carrier as worst case

H=horizontal and V=vertical
** Per FCC KDB 971168 D01 Power Measurement License Digital Systems V02r2. Sec. 5.8.3 with D=3m.

Configuration	LTE w/ Rated Output Power. Port 1 and 2 Terminated with 50 Ohm Load.
Band	Broadband PCS Downlink
Channel	High

Freq. (MHz)	H,V	SA Reading (dBuV)	Height (m)	Angle (degree)	EIRP =E-95.3 @ 3m (dBm)**		Absolute Limit (dBm)	Margin (dB)
3985	H	41.2	1.1	010	-54.1		-13	-41.1
5997.5	H	41.8	1.1	025	-53.5		-13	-40.5
7970	H	42.5	1.2	030	-52.8		-13	-39.8
3985	V	41.8	1.1	200	-53.5		-13	-40.5
5997.5	V	42.9	1.0	245	-52.4		-13	-39.4
7970	V	42.8	1.1	245	-52.5		-13	-39.5

NOTE:

*** Measured noise floor**
SA: Spectrum Analyzer
EUT's Signal.: 15MHz BW/QPSK /1 Carrier as worst case

H=horizontal and V=vertical
** Per FCC KDB 971168 D01 Power Measurement License Digital Systems V02r2. Sec. 5.8.3 with D=3m.

Section 7. Frequency Stability

Name of Test:	*Frequency Stability*	Test Standard:	*2.1055 22.355&24.235*
Tested By:	WEI LI	Test Date:	06/17/2013-06/25/2013

Minimum Standard:	Para No. 24.235. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
Method of Measurement:	Frequency Stability With Voltage Variation: The E.U.T. is placed in an environmental chamber and allowed to stabilize at +25 degrees Celsius for at least 15 minutes. Set SA resolution bandwidth low enough (30Hz) to obtain the desired frequency resolution. (Using frequency counter method: The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10MHz ref, in of the signal generator). With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V. Frequency Stability With Temperature Variation: The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -40 degrees C to +60 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.
Test Result:	**Complies**
Test Data:	See Attached Table

Frequency Stability Data in original application

Transmit Frequency Versus:
Temperature, DC Supply Voltage, and Carrier Bandwidths

DC Supply Voltage (V)	Temp (C)	Freq Error @ TX1 (Hz)			Freq Error @ TX2 (Hz)		
		5MHz	10MHz	20MHz	5MHz	10MHz	20MHz
-48	-40	3.6	1.2	5.1	2.5	4.4	7
-48	-30	2.3	2.7	2.9	0.9	0.7	3.3
-48	-20	1	1	4.3	2.9	0.3	0.8
-48	-10	2.8	2.2	3.6	0.8	3.8	1.1
-48	0	2.5	2.2	2.3	3.1	4.6	2
-48	10	0.1	1.6	1.5	0.2	0.6	1.2
-48	20	0.9	1.4	1.1	1.2	2.4	0.6
-48	30	2.9	0.5	0.2	0	2.5	2.7
-48	40	3.5	0.2	0.6	0.4	3.2	0.7
-48	50	0.4	0.9	1.1	1.8	2.6	0.3
-48	60	1.7	0.2	0.5	3.3	0.7	0.1
-39.5	25	0.6	1.6	0.5	4.3	4.4	3.1
-57	25	2	0.1	1.3	0.9	0.7	0.6
Maximum freq. error(Hz)		7					

FCC limit: 0.05ppm

Conclusion: Max. frequency error = 7Hz, i.e., 0.00357ppm, <the limit 0.05.

Section 8. Test Equipment List

Manufacture	Model	Serial No.	Description	Cal Due dd/mm/yy
HP	HP8546A	3448A00290	EMI Receiver	15/09/15
HP	E4432B	US38220355	250K-3GHz Signal Generator	15/07/15
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	15/09/15
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	09/02/15
Fischer Custom	LIPARTS NO.-2	900-4-0008	Line Impedance Stabilization Networks	15/09/15
Fischer Custom	LIPARTS NO.-2	900-4-0009	Line Impedance Stabilization Networks	23/08/15
EMCO	6502	2665	10KHz-30MHz Active Loop Antenna	27/02/15
EMCO	3115	4945	Double Ridge Guide Horn Antenna	13/09/15
R&S	ESPI	100018	EMI Receiver	16/07/15
HP	8569B	2607A02802	1GHz-22GHz Spectrum Analyzer	10/02/15
Delta Design	5900C	0-67-26	Temperature Chamber	24/03/15
HP	E8254A	US42110367	Signal Generator	23/03/15
Electro-Metrics	RGA-15	8-95	Double Ridge Guide Horn Antenna	10/02/15
EMCO	3116	4943	Double Ridge Guide Horn Antenna	11/01/15
Scientific-Atlanta	12A-18	441	Wave Guide Horn Antenna	04/08/15
HP	4419A	US37292112	RF Power Meter w/ Sensor Probe	20/07/15
Chamber	GD-32-33	LN2	Temperature Chamber	28/07/15
HP	6032A	3323A-09526	System Power Supply	01/07/15
Agilent	E4438C	US41460731	ESG Vector Signal Generator	01/07/15
Agilent	E4438C	US41460771	ESG Vector Signal Generator	01/07/15
Agilent	E4438C	US41460400	ESG Vector Signal Generator	01/07/15
Agilent	E4440A	US40420700	3Hz-26.5GHz Spectrum Analyzer	12/05/15
Lorch Microwave	5NF-800/1000-S	AC3	Notch Filter	
Lorch Microwave	5NF-1800/2200-S	AE10	Notch Filter	
RES-NET	RFA500NFF30	0108	30dB in-line Power Attenuator	
Narda	3043B-10	42255	Coaxial Directional Coupler	